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Gauge for Recording the Pressure of Gas or Air.

WE herewith illustrate a device for placing upon record the result of a continuous observation of the pressure of gas in a gasometer, or any other moderate pressure. To managers or superintendents of gas works such a reliable guide as that invented by Mr. DAVIS must be of great value, as it shows at once any dereliction of duty on the part of the men during the night, or at any other time, and also the exact time at which it occured.

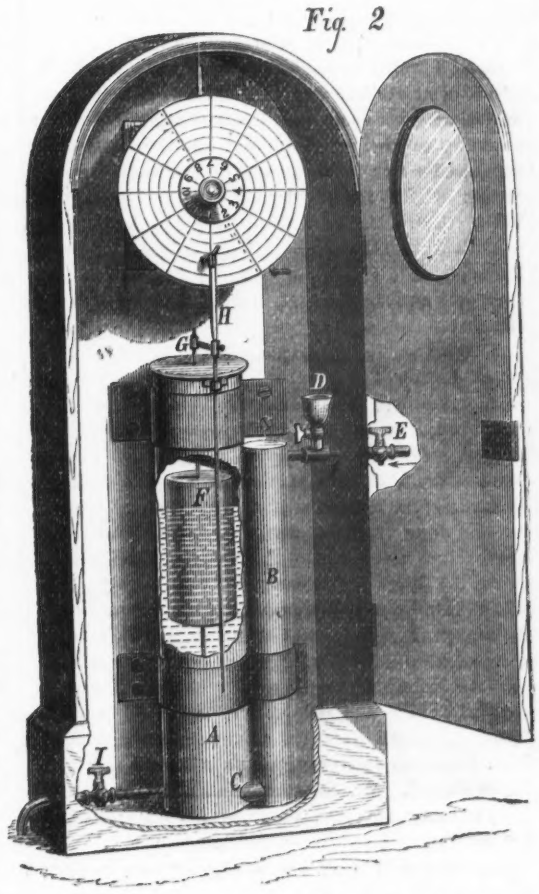
By means of a simple attachment the same gauge may be made to indicate the fluctuations of the tide, or of the water in rivers or reservoirs, in a perfect automatic manner, which is much more reliable than human observation of the phenomena.

The action of this gauge will be readily understood from the following description.

The cylinders A and B communicate with each other at the bottom by means of the short pipe C. Water is put into these cylinders through the funnel D. The pressure of the gas is transmitted through the pipe E to the surface of the water in the cylinder B which causes the water to fall in B and rise in A, carrying with it the float F. From the top of a stem attached to the float F, projects an arm or cross-head, G, which moves up and down, carrying with it the rod H, which acts as a guide, and also as a carrier for the pencil. The top of this rod is flattened out very thin, and, being of steel, is tempered so as to make it into a long flexible spring. The pencil-point, which is made of metal, is attached to the extreme end of this spring, and is kept in contact with the card by its flexibility. The card is ruled with straight radial lines, instead of curved ones, as on those designed for steam-engines, as the pencil moves in a straight line instead of a curved one. When the cylinders A and B are of the proper diameter, the indications are given inch for inch, and the card marked in tenths, as is usual in all gas-gauges. The indications can be enlarged or diminished by altering the diameter of the cylinder B. Sufficient buoyancy is given the float F to overcome the weight and friction due to the connections and the pencil. The cup D is provided for the purpose of filling up the cylinders conveniently in case the water should evaporate or be by any means reduced in quantity, so that the pencil-point falls below the zero-mark. The cock I is provided so that the water can be drawn off entirely or be reduced, to bring the pencil to the zero-line, if, by accident, too much water has been put in, in filling the cylinders. This gauge can be proved in a moment at any time; for by shutting off the gas by means of the cock E, and opening the cock D, equilibrium is established between the two cylinders, and the float will fall. If correct, the pencil-point will coincide with the zero-line; if it falls below that line, it needs more water; if above, there is too much water, and the quantity must be reduced by means of the cock I.

It will be seen that this gauge is of simple construction, and not liable to get out of order.

Fig. 2



RECORDING PRESSURE GAUGE.

The American Institute of Mining Engineers.

THIRD MEETING.

THE third meeting of the Institute was held at Troy, N. Y., beginning on Tuesday evening, the 21st of November. A goodly number of members and associates were gathered on the occasion, and the citizens of Troy manifested considerable interest in the proceedings. The chamber of the Common Council was tendered for the sittings, and Mayor CARROLL, in a graceful speech, welcomed the Institute to the city.

The venerable President, Mr. DAVID THOMAS, was present, and called the meeting to order; but delegated the active duties of the occasion to one of the Vice-presidents, Mr. RAYMOND, who replied on behalf of the Institute to the Mayor's address. In the course of his remarks, the speaker pointedly expressed the regret of the profession that the courses in mining and metallurgy had been dropped from the curriculum of the Rensselaer Polytechnic Institute, and vindicated the importance of both education and association in these important branches of industry.

A considerable number of members and associates, recommended by the Council, were then unanimously elected. We omit the names in this place, as we purpose to give, probably in our next number, a complete list of the officers, members and associates.

The first paper, read by Mr. DAVID THOMAS, on The Increase in the Production of Iron (published in full in another column) worthily introduced the proceedings. Mr. THOMAS's modesty led him to omit the fact, the subsequent mention of which was heartily applauded, that it was he who operated the first anthracite iron furnace, and thus planted the industry which has already reached such vast dimensions.

A paper by Mr. THOMAS M. DROWN, of Philadelphia, on The Attainment of Uniformity in Bessemer Steel, followed. This is likewise reproduced in another column. Its comparison of the English and German systems naturally elicited some discussion as to the position occupied by American practice; and Mr. A. L. HOLLEY, the engineer of nearly all the American Bessemer works, made an interesting statement with regard to this point, from which it appeared that in amount of blast and duration of heat, the American practice is nearly a mean between the extremes given. The paradoxical observation with regard to temperature, noted by Mr. DROWN, led Mr. HOLLEY to remark, that in his experience, the hottest charges were not always the most luminous, and hence, that deductions concerning temperature, drawn from the appearance of the charge, might be erroneous. Mr. DROWN replied that he was not prepared to say what was the real temperature in the cases observed by him. Mr. HOLLEY said that he judged by the effect on moulds, etc., and by the time taken in cooling. The method of testing the steel described in the paper (by means of a rod dipped into the molten charge, and subsequent examination of the adhering drops) has never been employed in this country, and is not common abroad. It seems to be feasible only when the heat is long.

Prof. W. P. BLAKE then presented a brief description of the efforts heretofore made by the Japanese to manufacture pig iron by our method. (This paper will be reported elsewhere.) In reply to questions from different members, Prof. BLAKE said that the Japanese made by methods of their own excellent malleable iron and steel. The famous excellence of the Japanese cutlery is due to the way in which the steel is worked into and combined with the iron. Thus the celebrated Japanese sword has a steel edge backed with iron. This combination presents upon the surface of the polished blade the peculiar appearance once supposed to be exclusively the property of the Damascus swords.

A paper by Mr. A. EILERS, on The Silver Smelting Processes of the West was read by the presiding officer, in the absence of the author. This exceedingly elaborate and valuable communication was prepared by Mr. EILERS from the notes of his own observations and those of Mr. O. H. HAHN, of Eureka, (also a member of the Institute.) We have already published in the JOURNAL the account given by Mr. EILERS of the Montana smelting works; and we are now publishing by instalments Mr. HAHN's treatise on the subject, referring particularly to Nevada and Utah. We therefore omit to reproduce the paper in its new form, which is but a combination in joint

authorship of the two essays mentioned. A fine suite of illustrative specimens of ores, furnace-products, etc., was exhibited to the Institute in connection with this paper, and drawings of the new Eureka furnace (similar to the engraving in last week's Journal) were inspected with interest by the members. The paper was the most thorough and complete presented at the Troy meeting, and received much praise, though the lateness of the hour and the magnitude of the subject precluded its discussion. Its two cardinal novelties, namely, the combination of the Pilz and Raschette furnaces, and the automatic syphon-tap of Keyes and Arents, will doubtless be much discussed by the profession hereafter.

WEDNESDAY'S PROCEEDINGS.

On Wednesday morning the Institute visited the new blast furnaces of the Corning Iron Company, at Albany, where they were received by Mr. Sackett, of whose genius and energy these stately works are a monument. We pass over the details of this visit, reserving for another occasion the work of describing the furnaces, and only remarking here that Mr. Sackett deserves much credit for the boldness and decision with which he adopted several "novelties," in spite of the conservative croakings of many of the Hudson River ironmasters. Among these features are the use of the Rossie red hematites and of fossil ores with the Champlain magnetites; the closed front, with the Lurmann-Asmus cinder-block (which, being put in according to the inventor's directions, works like a charm); and the cold tunnel-head, maintained by an extra height of the chimneys, without closing the top of the furnace. Whether the latter peculiarity is wholly advantageous, may perhaps be questioned. Possibly there is a downward draught through the tunnel-head, meeting the hot gases and effecting a partial premature combustion in the flues. But this we will not pause to discuss; and meanwhile the furnace in blast is doing admirably as to quantity and quality of product, and very well also in economy.

Returning to Troy, the party visited the Bessemer works, the Burden furnaces and shops, including the great Burden water-wheel, the Burden "squeezer," the celebrated horse-shoe machines, etc., and finished in these and other establishments a day of great interest and profit. At eight o'clock the hall of meeting was well filled, and the members and associates, apparently unaffected by the fatigues of the day, resumed their work. It was evident that they felt much better acquainted with each other, and more ready to engage in debate.

The proceedings began with the announcement of arrangements for an excursion to Port Henry, on Lake Champlain, and the iron mines and furnaces of that vicinity, to which the Institute was invited by the Champlain and Mount Moriah Railroad and Iron Company. Several other invitations to visit mines and works were received by the Council, but necessarily declined for want of time, though individual members were urged to accept them as far as their engagements would permit. A large number of members and associates were elected, and the following resolution, presented by Mr. Drown, was unanimously passed:—

Resolved—"That the thanks of the Institute are due to the Mayor and citizens of Troy, for their cordial and hospitable welcome, and for the tender of accommodations for our sittings; to the press of the city for its careful and kindly reports of our proceedings; to the proprietors of metallurgical works, for the courtesy with which they have received our visits; and to the local committee for the completeness of its preparation for our profit and entertainment."

The first paper, by Mr. T. Guilford Smith, of Philadelphia, described the block coal of Indiana, its extent and uses. This is the bituminous coal which can be employed without coking in the manufacture of iron; and it is matter for congratulation that so excellent a material is found to be extensive and abundant, instead of being confined, as was once supposed, to one or two localities. Specimens of the coal were exhibited. (We publish elsewhere an abstract of this paper.)

Mr. Smith presented also a paper on the Compound Propeller Pump, manufactured by the Hydrostatic and Hydraulic Company of Pennsylvania. This pump is based on the principle of the Archimedean screw, and is claimed to possess extraordinary qualities of power and economy. A careful trial of it is to be made before long in New York City, when it will be tested by the best engineers and compared with the best steam pumping engines of other constructions. Photographs and diagrams and a small working model, were exhibited at the meeting.

Prof. Thos. Egleston, of the School of Mines, Columbia College, New York, then gave an interesting account of a recent visit to Krupp's great steel works at Essen, Germany. This paper, which we hope to give next week, was followed with a volley of eager questions from the metallurgists present. We need scarcely say, that Krupp's secrets, if he has any, were not made known in the discussion. Prof. Egleston seemed to be of the opinion that a chief point, if not the whole art, of Krupp's manufacture of large cast-steel ingots, is the perfect system and precision of all the manipulations. The military manœuvers of the workmen employed in this department were described at length, and the great fifty-ton hammer received its due share of eulogy.

The next paper, by Edmund C. Pechin, of the Dunbar Iron Works, Pennsylvania, on The Recent Explosion of a Blast Furnace in Youngstown, Ohio, gave rise to considerable discussion as to the probable causes of the mysterious catastrophe. (This paper will be published as soon as possible in the Journal.) Prof. Egleston recalled an explosion in France, in 1858, of a similar character—caused, in that instance, by the sucking back of the furnace-gases into the regulator, whence they re-entered the furnace, forming an explosive compound. Mr. Firmstone, of the Glendon works, remarked that small explosions from gases were frequent enough, but not alarming in their consequences. Several members suggested water from tuyeres or elsewhere as the cause; but this too was deemed by others inadequate to the effects described. The debate left the question unsettled; and it was generally admitted that ironmasters should inquire more carefully into such occurrences and their causes, since all are continually exposed to similar dangers.

A highly suggestive paper was presented by Professor Prime, of Lafayette College, Easton, on The Economy of the Blast Furnace. (This paper will be published next week.) At its close a lively debate ensued, with regard to several of its recommendations. Mr. Pechin said that at Dunbar, and by Blair and Schoenberger at Pittsburg, a preliminary calcination of the iron ore is carried on with favorable results. The merits of the Westmann kiln, and its use at the Ringwood furnaces, were discussed by Professors Egleston and Maynard and Mr. Firmstone. All the speakers concurred in the opinion that calcination (except for a few classes of ores, such as very pure red hematites) would greatly facilitate the subsequent fluxing and reduction of iron ores in blast-furnaces. With reference to mechanical chargers, Prof. Egleston said that Parry's is the one now preferred abroad. Mr. Sackett remarked that he had tried the experiment of breaking his charges finer, but without finding any perceptible gain in it.

Mr. Raymond read a paper on Electricity and Rocks, which is elsewhere given. At its close, Professor Egleston narrated an interesting case of electrochemical reaction, occurring in his cabinet of minerals. A specimen of chloride of silver had been mounted upon a copper wire for better display, and was left in this position for some time, when it was found that a voltaic current established between the two minerals had resulted in the formation of chloride of copper, and the reduction of part of the argentic chloride to metallic silver, in pseudomorphic form. Mr. Raymond described occurrences of analogous character in his cabinet of minerals, in which the decomposition of one specimen had infected a whole drawerful—an annoyance to the collector in which many of the members expressed themselves as qualified by experience to sympathize.

The session was then adjourned, after the announcement that the members were expected to meet the next morning at the railway station, to start upon their northward trip.

We are compelled to suspend at this point our report of the proceedings. Next week we shall continue the account, narrating the events of the delightful excursion to Port Henry, and the two sessions of the Institute, held, one upon the steamer, en route, and the other in the parlors of the Sherman House, at Moriah. We shall publish in full, or in abstract, in the present and succeeding numbers, the papers presented at all the sessions; and copies of these publications will be sent, by order of the Council, to all members and associates.

The Attainment of Uniformity in Bessemer Steel.*

By Dr. Thomas M. Drown.

The means relied on to attain uniformity in Bessemer steel may be enumerated as follows:—

I. The appearance of the flame.
II. The appearance of the slag.
III. The spectrum of the flame.
IV. Examination of the steel itself.

At present, I wish briefly to bring forward a few considerations with reference to the last two mentioned, namely:—the conditions favoring the employment of the spectroscope and examination of the steel.

From the amount of careful investigation, which has been devoted to the examination of the Bessemer flame by the spectroscope both on the part of scientists and practical metallurgists, one might reasonably expect some results definite and satisfactory in their nature, first, as regards the nature of the flame and second, as to the practical value of the spectroscope as a guide in conducting the process. We find, in fact, however, that uncertainty and confusion still exist. In Germany, where this subject has received the greatest attention, it is now very generally conceded that manganese is the cause of the well known groups of dark bands that characterize the Bessemer spectrum. Nor is it easy to see how we can avoid accepting this conclusion, when Wedding and von Lichtenfels have produced the manganese spectrum and found it to correspond closely with that shown by the Bessemer flame.

But it is evident on a moment's reflection, as Roscoe has recently brought forward, that manganese cannot be the only cause of the Bessemer spectrum, for we notice the characteristic bands quite as plainly when English pig iron is blown, which does not, at the beginning of the operation contain as much manganese as the German pig iron does when the blow is completed, and the dark bands have completely disappeared from the spectrum.

Roscoe considers the bands to be due to carbon, which is known under different circumstances to present different spectra. Whatever may be the truth of the matter, one thing is certain, that the disappearance of the lines from the spectrum is coincident or nearly so, with the disappearance of carbon from the iron.

The question of the practical use of the spectroscope in the Bessemer process is, however, fortunately independent of any theory that we may hold regarding the causation of the spectrum, although we must admit, that the idea of the lines being caused by carbon or carbonic oxide, the disappearance of which from the spectrum, coincides with the disappearance of carbon from the iron, has in it something attractive, affording as it does a common stand-point for theory and practice.

It is solely to the practical side of the question, that I wish to draw attention now, and endeavor to reconcile, if possible, the conflicting statements made regarding the value of the spectroscope as a guide for stopping the blow.

* A paper read before the Am. Inst. of Mining Engineers.

The clew to the difficulty is to be found, I think, in the fact, that the reports from Germany are almost unanimous as regards the practical advantages to be derived from the use of the spectroscope, whereas in England it is looked upon mainly as an instrument of scientific interest, which although it indicates promptly when to stop blowing, yet is no more accurate in its indications, than is the flame itself to the unaided eye of an experienced workman.

The most emphatic endorsement of spectroscopic observations of the Bessemer flame, that we have noticed from England, are the statements of Mr. SNELLUS of Dowlais and Mr. BRAGGE of Sheffield, both quoted by Mr. ROSCOE in his paper on "Spectrum Analysis recently read before the Iron and Steel Institute of England. "Mr. SNELLUS has informed me," writes Mr. ROSCOE, "of the result of a series of experiments, which go to prove what appears to me to be a very important point, and that is this—not only does he agree with me in finding that the point of decarbonization can be accurately reached by means of the spectroscope, but he believes that it is also possible at the beginning, or in the course of the blow, to predict how long the blow will last—that is to say, he predicts in the middle of a blow, that the blow is going to last, say, for 18 minutes; and he finds that it does actually last 18 minutes. He then predicts, in another case, 24 to 25 minutes; and he finds that it really lasted 23½ minutes. He then predicts 32 minutes in another blow, and finds that it did take 32, and so on through thirty experiments, which were made both at Dowlais and Ebbw Vale."

When we consider that a few seconds more or less blowing materially affects the character of the steel produced, the practical advantage of the use of the spectroscope cannot be said to have received much support from these experiments although in themselves of interest and value. The report of Mr. BRAGGE, also quoted by Mr. ROSCOE, is to the effect that the spectroscope is daily used in the Atlas Works for determining the point of the disappearance of the carbon, and that to a certain extent they are satisfied with the result, especially in the case of new metal.

In Germany, on the other hand, as is well known, there are many Bessemer works where the spectroscope is relied on exclusively for stopping the blow. So plain are its indications found, that in Zwickau in Saxony, for instance, it is used by uneducated workmen with complete success.

That there must be a cause for the difference of opinion existing in England and Germany on this subject, independent of the love of the Germans for scientific research in practical matters, on the one hand, and the excessive conservatism of the English in established manufactures, on the other, must be conceded, for the practical failure of the spectroscope to aid the Bessemer process in England is the result of fair trial by scientific and practical men.

When one first observes the Bessemer practice in Germany, after being familiar with the English method, he is struck by the fact, that the duration of the blow is much longer, as a rule, and the heat of the charge much greater.

The cause of the greater duration of the blow must be either that there is more to oxidize in the German pig iron than in the English or that the rate of oxidation is slower. By comparing the two pig irons we find that the English usually contains more silicon, the German more manganese, and also, as a rule, slightly more carbon, but the difference is not sufficiently great to account for any marked difference in the duration of the blows.

We must look for the cause then in a diminished rapidity of oxidation, which is dependent on the pressure of air and the number and diameter of the tuyeres. The pressure employed is very generally the same in all countries, as the height of the iron in the converter is generally uniform, but the number of tuyeres employed is very variable.

I regret that I have not been able to collect more data on this subject, but the following examples will nevertheless show clearly the difference of the English and German practice in this respect:

	Capacity Converter,	No. of tuyere-holes.	Diameter.	Total area, in sq. in.
Konigshütte,	3	49	¼ in.	2.40
Neuberg,	3	49	¼ in.	4.27
Zwickau,	3	42	2-5 in.	5.12
Heft,	2	42	¼ in.	3.66
Crewe,	5	144	⅝ in,	15.59
Dowlais,	5	156	⅝ in.	17.22

If we reduce the number of square inches in each instance to the standard of 1 ton capacity we have for,

Königshütte	0.80
Neuberg	1.43
Zwickau	1.71
Heft	1.83
Crewe	3.18
Dowlais	3.44

In this country, at Harrisburg and Troy, we have 120 tuyere-holes of ⅝ in. in 5 ton converters, making a total area of 13.25 square inches, or 2.65 per ton capacity, which is about a mean between the German and English practice.

From these examples it will be seen, that the relative amount of air forced into the converter in England is nearly double what it is in Germany, and we can thus see why it is that the duration of the blow should be so much longer in the latter country. What may have been the original cause of the adoption of a smaller number of tuyeres in Germany, I do not know, but that this fact has an important bearing on the use of the spectroscope will be evident on a moment's consideration. The spectroscopic indication of the complete decarbonization of the iron is the disappearance of the characteristic lines from the spectrum. If, in the last stage of the process the oxidation of the carbon is effected very rapidly, as in England, the disappearance of these lines may be almost instantaneous, and afford no better indication of the conclusion of the blow than the dropping of the flame, with which it is coincident. If, on the contrary, the oxidation proceeds comparatively slowly, as in Germany, the lines fade away gradually, and it is from the degree of distinctness of the lines, that the degree of decarbonization is judged.

It requires but comparatively little experience to enable one to estimate with very great nicety, the extent of the decarbonization by the degree of distinctness of the characteristic bands in the spectrum. Although a practised eye will often unaided be as correct in its decision as one provided with a spectroscope, yet in the long run there can be no doubt that greater accuracy and simplicity of working is attained by relying exclusively on the indications of the spectrum, provided that the rate of oxidation is not too rapid.

The employment of an excessive number of tuyeres prevents, too, the nice adjustment of the amount of air to the amount of carbon and silicon towards the end of the process. It is readily conceivable that when the amount of these elements remaining is very small, that they may not be able to preserve the iron from oxidation in presence of a large amount of air.

WHether the heat of the charge has anything to do with the reliability of the spectroscopic indications cannot be definitely stated, but it seems reasonable to suppose, that the higher the temperature the more satisfactory the observations will be. The only evidence bearing on this point is from BLEICHSTEINER of the MAXIMILLIAN'S Hütte in Bavaria, who has observed that with hot charges, with much smoke, which accompanies highly manganiferous pig iron, the Bessemer spectrum disappeared before the complete decarbonization of the iron had taken place, whereas with cold and non-smoking charges, the disappearance of the spectrum and complete decarbonization were coincident.

I have already mentioned the fact, which I think, will be generally admitted by those conversant with the subject, that the heat of the charge is, as a rule, greater in the German practice than in the English. This fact I have noticed particularly at Zwickau where the flame in the last stage of the blow is so intensely bright, that colored glasses are almost indispensible to protect the eyes. The cause of the higher temperature attained in Germany is somewhat obscure.

In general, the sources of heat in the Bessemer process may be enumerated as:—

1st. The initial heat of the metal in the converter, which depends on the temperature of the pig iron as it flows from the cupola, and the temperature of the converter.

2d. The heat resulting from oxidation of the silicon, which is equal, according to JORDAN, to 6382.4 units for every kilogramme oxidized by atmospheric air to silicic acid.

3d, The oxidation of iron, equal to 757 units per kilogramme of iron oxidized to protoxide.

4th. The oxidation of manganese to protoxide, equal according to JORDAN, probably to the same amount as in case of iron.

5th. The oxidation of carbon to carbonic oxide, in which case only 475.2 units are available in the process per kilogramme of carbon.

The main source of the increase of heat during the process is due, therefore, to the oxidation of silicon, which is much more largely present in English pig than in the German. Not much influence can be attributed to the manganese, as it merely replaces iron in the slag, and as we have assumed the thermic effects of the oxidation of manganese and iron to be equal.

I have thought that it might be possible in those instances where the English practice is followed of blowing with a large number of tuyeres, that some air might pass through without having all its oxygen absorbed. When we consider, that the depth of iron in the converter would be only 12—14 inches in height, were it in a state of rest, and that it is tossed about by a current of air with such violence as to be often ejected, in part, from the mouth of the converter, such a condition of affairs seems not improbable. If it is ever actually the case, a loss of heat would, of course, be the consequence.

The only experiments which bear on this point, as far as I know, namely those of Snellus of Dowlais do not, however, support this view. He examined the gases evolved from the converter during a blow of 18 minutes at 2, 4, 6, 10 and 12 minutes after the commencement and found no free oxygen present, showing that it had been completely absorbed.

But as the experiment was not tried primarily with a view of determining this point, it may be, that the conditions with reference to pressure and amount of blast were not as we have supposed.

The more rapidly the oxidation proceeds, other things being equal, the higher, of course, will be the resulting temperature. If it should be proved, therefore, that the limit of tuyere area has not been exceeded, and that the oxygen of the blast is completely absorbed even in the extreme cases which have been mentioned, then the English practice of blowing ought to be more favorable to the production of a high temperature than the German.

Apart from these considerations, it is undeniably true, that there are many great advantages resulting from a very high temperature in the converter, one of the most important of which is the opportunity afforded for testing the steel before casting. In spite of accumulated experience gained in conducting the Bessemer process, in spite, moreover, of the great assistance we may derive from the use of the spectroscope, it must, nevertheless, be admitted, that absolute certainty with regard to the quality of the steel produced can only be gained by examining the steel itself.

In Zwickau, where the process is performed without the usual addition of spiegeleisen or other form of pig-iron, the blow is suspended when the spectrum indicates that the decarbonization is sufficiently complete. A long rod of iron is then inserted into the converter, to which a quantity of slag adheres,

through which are dispersed beads of metal. The rod, after removal, is at once plunged into water and allowed to remain till cold. The metallic beads are then separated from the slag and tested by hammering as to their hardness and malleability. According as the result of this test is satisfactory or otherwise, the steel is poured into the ladle, when sufficiently cool, or the converter is turned up again and the blast continued for a second or two longer. By this system perfect uniformity of product is obtained.

That this result is rendered possible by having a temperature in the converter much higher than is simply necessary for casting, shows the practical value of high heats. Whether the advantage of uniformity of product would be considered more than counterbalanced by the shorter duration of the converter lining, is a matter to be determined from an economical stand-point, which it is not my purpose, at present, to discuss.

Philadelphia, Nov. 18, 1871.

Sewage.*

By Dr. Firman Coar.

The history and working of sewers, their misuses, and the means of remedying the difficulty, formed the chief features of this paper. The author noted the difficulty caused by a lack of sufficient water to carry off the solid matter, and the disease caused by sewers worked on this principle in Rome and the old Roman towns. He said that it was impossible to construct a sewer by the use of cement which would remain impervious to water. The obvious improvement on this state of affairs was to increase the water-supply of the city, by bringing, in pipes, the water of some adjacent lake or river and using it liberally in the sewers, so as to remove all offensive matter before it began to decompose. The theory was noticed that by having an abundant supply of water, the oxygen of the water would unite so rapidly with the nitrogenous compounds of the sewage that a harmless salt would result, instead of an offensive and unhealthy gas. The author then referred to English cities where large amounts of money have been spent on sewage, and where this system has been more fully developed than anywhere else. He said that in London thirty million pounds sterling were expended on sewers from 1846 to 1866. A large main sewer was built along the river, having its mouth twelve miles below the city, and into this the smaller sewers now empty so that the water of the river is not contaminated, as was formerly the case. At the mouth of this large sewer reservoirs are constructed, into which the sewage is discharged and allowed to settle, the watery portions being purified by flowing over a large surface of land before entering the river.

The author then proceeded to show from a number of analyses that a large quantity of nitrogenous matter, that doubtless entered the sewer, could not be found in the discharged sewage, which proved that it must have escaped and at least a portion of it combined in gaseous form went to pollute the atmosphere. The oxydation of nitrogenous matter proceeds so slowly that if sewage were discharged into a river flowing one mile per hour, some of the matter would be carried 168 miles before it was oxidized. Sewage contains but small amounts of nitrates. He considered it possible, however, that a portion of the nitrogen united with the surrounding earth and with the materials of which the sewer is built, to form insoluble compounds, but this process would be limited in duration.

The author then cited the evidence of a large number of scientific men all of which went to confirm the statement that gases were generated in the sewers, and that these gases are exceedingly unhealthy. It has been proposed that this gas should be burned, and thus rendered innoxious, but it has been estimated that to do this in London there would be required two hundred and thirty furnaces with high chimneys which would cost £460,000 to build and £225,000 per year to operate.

In view of these facts it is difficult to see how by the present system of sewers we can meet the three great requirements of health, viz: pure air, pure earth and pure water. It is the opinion of a large number of intelligent men, who have investigated the subject that the only way to prevent sewers from becoming a permanent nuisance is not to allow fecal matter to enter them at all, and the enactments in England are such that it will soon be impossible to use the sewers for carrying off this substance.

Of the various other methods that have been proposed and tested for this purpose, the author only mentioned those that propose to utilize the excrement. First he noticed the cask system, which has been tested for over ten years in Gratz, Austria, a city of nearly 100,000 inhabitants. Each house is provided with a cask which is removed every three or four days and replaced by an empty one and sufficient disinfecting material to be thrown in from time to time in order to prevent smell. The filled casks are carted out of the city, and a portion of their contents disposed of to farmers, while the rest is converted into poudrette. The value of the manure thus obtained very nearly pays the whole expense, but the system is inconvenient and objectionable to our American ideas, still it has very decided merits. The earth-closet was also mentioned. The author said that the Gaux system was a sort of combination of the cask and earth closet system.

A pneumatic system has also been proposed by a Dutch engineer, by the employment of which the disagreeableness of having casks carried out of the house at inconvenient times is avoided. Air is used as the motive power for conveying the matter from the houses to air-tight iron receivers. According to this plan, the city is divided into complexes and sub-complexes; the latter consisting of about two hundred houses, and the former of all the sub-complexes within a radius of half a mile.

Each sub-complex would be provided with an air-tight reservoir of cast-iron, which would be connected with each house by means of cast-iron pipes, laid under the street, and branches to the closets. These pipes are provided with traps and cocks, so that they may be closed when a blast of air is not necessary to empty the pipes. The cocks are placed in the main pipes near the reservoirs, and may be worked by keys from the surface of the street. A self-acting valve is placed in the branch, or service pipe, at its junction with the street pipe. The branch pipes as well as the mains are provided with traps at different intervals. The reservoir is provided with a pipe through which the air is exhausted, and also a pipe near the bottom for drawing off the contents.

The fecal matter entering the branch pipe at the closet would fall by means of its gravity through the first trap, and so on till it enters the street main, and if all the pipes should become full (which would rarely happen), the contents would flow into the reservoir; but generally, in order to empty these pipes thoroughly, it would be necessary to exhaust the air from the reservoir with which these pipes are connected. This would be done by means of a powerful steam-engine working at the large reservoir with which each complex would be provided, and which is in connection with all the reservoirs of the sub-complexes in that division. Before opening this connection it would be necessary to close that between the sub-reservoirs and the pipes leading to the houses, and when the air in these reservoirs was exhausted, the connection with the main reservoir would be closed, and the connection with street main and the branch pipes opened. The pressure of the air on the matter within the pipes would push it forward into the sub reservoir, and the valves at the mouth of each branch pipe would prevent any back draught from entering the house. Should the first exhaustion of the air in the reservoir not be sufficient to convey the contents of the pipes all the way into the reservoir, a second exhaustion could easily be made, and in less than five minutes the contents of all pipes of a sub-complex conveyed into the main reservoir. The author was not aware that it had been suggested to convey the matter from the main reservoirs to some point outside of the city by the same process, though there could be but little difficulty in accomplishing it.

Though the main plan of this system is simple enough, still the details of the work would give ample scope for the exercise of considerable ingenuity and skill. Its introduction would prevent the waste of a valuable material, as well as the polution of our atmosphere and the water of our rivers. It is free from the objections which might be made to the cask system on the score of decency and convenience, and has given great satisfaction for the past two years and a half in Prague, Bohemia, and for a year and more in Brunn, Moravia, where some forty reservoirs are in operation. It will shortly be introduced into a number of German cities.

The author concluded with some observations on the importance of returning to the soil its natural nourishment, of which it is now deprived by the existing system, and showed by the results of a number of analyses the great value of the product now wasted. He thought that the nitrogenous matter constituted the most valuable element of this fertilizer, for the other elements are furnished in large quantities by the mineral manures which occur in abundance.

* A paper read before the Polytechnic Association.

Blast Furnace in Japan.*

Considerable quantities of volcanic iron-sand occur at and near Cori, upon the shore of Volcano Bay, Yesso. The Japanese have attempted to utilize it by smelting in a blast furnace. Prof. Blake examined the deposits and reported upon them, and the furnace, in 1862, for the Japanese government. The furnace was about thirty feet high, and was constructed, according to drawings of European furnaces, of fire-brick made in the vicinity. The preparations for a blast were inadequate, being merely the usual wooden rectangular single-acting pump-bellows of the country.

As it was evident that the loose fine sand could not be worked in a high furnace, he recommended the abandonment of that enterprise, and the trial of the ordinary forge fires, such as are used for making blooms direct from the ore.

Good magnetic ore is mined in the Province of Nambu, on Nipon, opposite Hakodadi; and a small blast furnace upon an American model gave fair success there. The ordinary Japanese iron smelting furnace consists of a rectangular box-like receptacle, opened at the top, and rising a few feet only above the ground. The blast is supplied by the piston bellows, worked by one or more men.

The steel made in Japan is sold in irregular lumps, as broken from larger masses. It is spongy and cavernous, and excellent in quality. They are very expert in working steel into the cutting parts of their swords, knives and tools, the backs being made of soft, tough iron. The extraordinary strength and cutting qualities of their swords appear to be due to this combination, for while the iron supplies the toughness, the steel edge can be highly tempered without danger of its breaking.

The recent rapid advances by the Japanese in the arts of modern civilization were then spoken of, and the hope was expressed, that in the attempts of the Japanese to produce iron and steel according to our improved method, they would receive all assistance and encouragement from American engineers.

* Remarks of Prof. W. P. Blake, before the Am. Inst. of M. E.

Engraving on Glass.—Words and designs may be printed on glass, by the use of type made of any suitable elastic material. The printing ink contains, however, fluoride of calcium incorporated with it, and when the glass which has been thus printed on is submitted to the action of hot sulphuric acid, sulphate of lime is formed, and hydro-fluoric acid set free, which immediately attacks the glass in the place of its birth. On subsequently washing off the ink stains, &c., the design is found to have been beautifully etched upon the plate.

THE COAL TRADE.

B. R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, Dec. 2, 1871.

WHOLESALE.—The principal feature of the week was the Scranton Auction Sale, which took place on Wednesday last. The attendance was large and the bidding spirited. 100,000 tons of the various sizes of coal were sold as noted below.

10,000 tons	Lump	$3 35 @$3 50
10,000 "	Steamer	3 57½@ 3 72
17,000 "	Grate	4 12½@ 4 15
13,000 "	Egg	4 27½@ 4 30
37,000 "	Stove	5 07½@ 5 25
13,000 "	Chestnut	3 85 @ 4 17½

The following is the average price obtained for each size (obtained from the company). Lump, $3 38¾; Steamer, $3 64; Grate, $4 14¼; Egg, $4 28½; Stove, $5 17½; Chestnut, $4 02.

These prices approximate to what we claimed the coal would bring in our last issue. In justice to the trade, we will say that they are about 25 cents per ton higher than was expected. Stove coal particularly sold well and at prices that it is hard to tell how any profit can be realized from it, in competition with the retail price at which the large companies are selling coal. The following is the circular of the Lehigh Exchange:

NEW YORK LEHIGH COAL EXCHANGE.

NEW YORK, Nov. 29, 1871.

At a meeting held this day, the following prices were adopted for December shipments at Elizabethport, Port Johnson, and Hoboken.

Lump	$5 00
Broken	5 00
Egg	5 00
Stove	5 50
Chestnut	4 50

Attest: E. BELKNAP, Secretary.

The following circulars have been issued by the other larger companies.

OFFICE OF THE LEHIGH COAL AND NAVIGATION COMPANY, 80 BROADWAY.

NEW YORK, December 1st, 1871.

"OLD COMPANY'S LEHIGH COAL."

For the present, the following prices have been fixed for this Company's Coals.

The Company reserves the right to advance the same, at any time, except on contracts made prior to such change.

All sales subject to the usual conditions.

	Old Company's Lehigh, at Port Johnston.	Room Run, at Port Johnston.	Newport, at Port Johnston.
Lump,	$5.00	$5.00	$4.00
Broken,	5.00	5.00	4.50
Egg,	5.00	5.00	4.60
Stove,	5.50	5.50	5.50
Chestnut,	4.50	4.50	4.50
" No. 2,	3.75		

WM. H. TILLINGHAST, Agent.

Office of the Wilkes-Barre Coal and Iron Co., 80 Broadway. New York, Dec. 1, 1871.

WILKES-BARRE COAL.

For the present the following prices are fixed for this Company's coal, delivered at Hoboken or Port Johnston, N. J.

The Company reserves the right to change same at any time, except on contracts made prior to such variation.

All sales subject to our printed conditions:

Lump	$4 00
Steamer	4 00
Broken	4 50
Egg	4 60
Stove	5 50
Chestnut	4 50

Every contract for the delivery of coal must stand upon its own merits as regards price, terms and conditions of sale.

JOHN F. WILSON, Sales Agent.

Notwithstanding the above low rates for coal, in severe winter weather, the demand is very light.

It is now evident that some steps must be taken to curtail the production of coal in some of the ways pointed out by this journal during the last few weeks. A telegram from Scranton already notifies us as follows:

SCRANTON, PENN, Dec. 1.—The great fall in the coal prices at New York has created considerable excitement among the miners in this locality. Main street in Hyde park was crowded all day with miners, who argued and predicted that another strike would take place in January next. The streets were filled with those who believed that the next auction sale of coal by Messrs. DRAPER & Co., would cap the climax, and bring coal to such a low standard that a strike would be inevitable, and should the Delaware, Lackawanna and Western Company reduce the price of mining coal from ninety-three and a half cents per diamond car to eighty-six cents, a long and stubborn strike will be the result. The miners are not satisfied with the price now paid them for the risk they claim to be under, and are at any moment ready to strike and cause another famine among a great number of families who live from hand to mouth. The Audenried Shaft, near Wilkesbarre, sunk to-day nearly two feet, and has caused great excitement among inhabitants in the neighborhood, but there is no great danger apprehended.

RETAIL.—There is no change to note; prices remain as we quoted them last week. Business is good.

FREIGHT.—Boston 2.25; Providence 1.50; New Haven 1.10.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Nov. 25, 1871, compared with week ending Nov. 26, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	78,445	2,914,139	84 229	3,606,432
Schuylkill Canal	26,505	541,239	28,957	994 861
Lehigh Valley R. R.	47,245	2,781,625	61,386	2,176,468
Lehigh & Sus. R. R.	22.105	935,105	29,411	1,162,900
Lehigh Canal	25,292	758,861	29,306	722,330
Scranton North	8,664	654.798	11,945	503,672
" South	36,454	1,638,010	48,563	1,124.277
Penn. Coal Co., rail	18,923	1,043,835	25,898	698,816
" " canal	107	16,603	....	13,962
Del. & Hud. Canal Co.	107	1,292,675	37,376	991.787
" " East	17,529	408.985	8,537	308,525
" " West	4,420	78,955	3,465	106,537
South	2.508	410,624	9,366	301,515
Shamokin	8,978	445,591	11,830	584,764
Treverton	....	67.371	....	....
Lykens Valley Coal Co.	2,606	67,254	2,080	87,116
Wyoming South	19,205	326,645	....	....
Wyoming North	....	....	....	4,167
P. N. Y. C. & R. R. Co.	4.719	272.976	....	104,987
Williamstown Col'y	5,361	277,319	....	....
Big Lick Col	2,485	87,595	3,585	136,022
Total	325,448	15.020,205	396,613	13,629,138
1870		13,629,138	325,448	
Decrease		1,391,067		
Increase			71,165	

* Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coa passing over the following routes of Transportation for the week ending Nov, 25, 1871, compared with week ending Nov. 26, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
C. & O. Canal	13,100	507,861	14 212	643,919
B. & O. R. R.	20,494	790,302	25,505	1,121,848
H. & B. T. R. R.	4.947	281 497	7,215	292,662
Harrisburg & D.	10,982	689,791	16,277	730,810
*L. V. R. R.	1,634	13,847	2,037	354,517
P. & N.Y.C. & R. Co.	4,411	237,420	....	....
Cumberl'd Branch Canal	368	83.884	4,873	190,207
" Railroad	1,397	109,499	1,577	64,374
Total	57,333	2,705,011	71,696	3,393,337
			57,333	2,705,011
Increase.			13,363	693,326

The tonnage of the P. & N. Y. C. & R. R. Co. is included in that of the L. V. R.R. Co

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending Nov. 25—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons. cwt.
Wyoming Region	28056 04	23144 04	1178670 09	1139877 08
Upper Lehigh Region	4121 13	3024 01	94170 16	139013 15
Beaver Meadow Region				
Hazleton Region	8278 09	8443 05	205929 14	305191 14
Mahanoy Region				
Treskow Region	3024 09		72588 18	
Mauch Chunk Region	6174 00	5521 03	206554 00	111590 18
Totals	48554 15	40132 13	1757892 17	1694673 15
Increase	8422 02		63219 02	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	29411 16	22105 04	1162900 06	935105 08
Forwarded East of Mch Chunk by Canal	13597 01	14018 12	410933 15	511238 00
Delivered at and above Mauch Chunk	2130 17	1089 06	61875 12	41828 03
Delivered to L. & B. R. R. at Plymouth Bridge	3050 06	2358 13	94256 07	182473 00
L. V. R. R. at Packer'n	364 12	560 18	28025 17	23429 04
Totals	48554 15	40132 13	1757892 17	1694673 15
Of the above there was transported on acc'tn of L. C. & T. Co	10293 11	7566 10	309025 19	193162 02
W.-B. C. & I. Co.	15809 15	13131 04	783145 07	563879 05
Totals	26193 06	20997 14	1091469 06	757041 07
Increase	5195 12		334427 19	
Decrease				

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Nov. 25, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	25,897 18	698,815 19	18,622 18	1,043,835 00
" Canal	.....	13,962 14	107 10	16,602 18
Total	25,897 18	712,778 03	18,730 08	1,060,437 18
Decrease 1871, 347,659 15				

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, November 25, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons.	Cwt.
From St. Clair	46,404	19
" Port Carbon	5,450	11
" Pottsville	902	09
" Schuylkill Haven	5,218	04
" Pine Grove	5,815	11
" Tamaqua	17,849	16
" Harrisburg		
" Dauphin	4,999	16
Total	86,641	06

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	15,673	15
" Mill Creek "	1,163	12
" Schuylkill Valley Scales	1,687	11
" Mt. Carbon "	33	10
" Cressona "	5,219	13
" Pine Grove "		
" Tamaqua "	1,868	15
Total	25,646	16

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	717	10
" Shamokin	4,550	08
" Herndon	.....	
Total	5,267	18

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,313	18
" Lebanon & Pine Grove Branch	969	10
Total	2,282	08

CONSUMED ON LATERALS.

From Frackville Scales	1,097	01
" Mill Creek "	703	02
" Schuylkill Valley Scales	234	04
" Mt. Carbon "	556	00
" Cressona "	481	02
" Pine Grove "	195	10
" Tamaqua "	500	02
Total	3,767	01

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	99	12
" " Alburtis, "	29	18
" " Oreland, G. & N. Br.	593	12
" " Connecting R. R.	.....	
" " Willow Street R. R.	173	03
Total	901	05

BITUMINOUS.

From Harrisburg	11,277	06
" Connecting R. R., G. & N. Br.		
" Junction R. R.	152	00
Total	11,429	06

COAL FOR COMPANY'S USE.

Anthracite	4,628	18
Bituminous	366	01
Total.	4,994	19

RECAPITULATION

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val. Branch	86,641 06	78,461 18	i 8,179 08
For Shipment by Canal	25,646 16	25,203 14	i 443 02
Shipped Westward via Northern Central R. R.	5,267 18	4,981 14	i 286 04
Shipped West or South from Pine Grove	2,282 08	2,215 07	i 67 01
Consumed on Laterals	3,767 01	3,045 11	i 721 10
Lehigh and Wyoming Coal	901 05	147 13	i 753 12
Total Anthracite paying fr'gt	124,506 14	114 055 17	i 10,450 17
Bituminous	11,429 06	7,286 03	i 4,143 03
Total of all kinds paying fr'gt	135,936 00	121,342 00	i 14,594 00
Coal for Company's use	4,994 19	3,719 16	i 1,275 03
Total Tonnage for Week	140,930 19	125,061 16	i 15,869 03
Since Dec. 1, 1870	5724280 08	4437062 18	i1287217 10
Total to date	5865211 07	4562124 14	i1303086 13

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	27,174 09	25,626 05	i 1,548 04
" Port Clinton	1,783 00	503 00	i 1,280 00
Total Tonnage per Week	28,957 09	26,129 05	i 2,828 04
Since Dec. 1, 1870	965,903 14	519,460 01	i 446443 13
Total to date	994 861 03	545,589 06	i 449271 17

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, Nov. 25, 1871:

	tons.	cwt.
From St. Clair	46,414	19
" Port Carbon	5,450	11
" Pottsville	902	09
" Schuylkill Haven	5,218	04
" Auburn	8,303	15
" Port Clinton	17,849	16
" Allentown and Alburtis	129	11
" Harrisburgh and Dauphin	16,277	02
Total paying freight	100,546	07
Coal for Company's use	4,994	19
Total for week	105,541	06
Previously this year	4,318,429	03
Total	4,423,970	09
To same time last year	3,685,843	16

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, Nov. 25, 1871.

	Tons.	Cwt.
From Port Carbon	—	—
" Pottsville	—	—
" Schuylkill Haven	27,174	09
" Port Clinton	1,783	00
Total for week	28,957	09
Previously this year	965,903	14
Total	994,861	03
To same time last year	541,239	06

Shamokin Coal Trade.

For week ending November 25, 1871	11,830 07
Same time last year	18 978 05
Increase	2,852 02
Decrease	
Total amount shipped to date	584.764 00
Same time last year	445,590 18
Increase	139,173 02
Decrease	

Huntington and Broad Top R. R. Co.

For week ending Nov. 25, 1871	7,215 tons.
Same time last year	4,947 "
Increase	2,268
Decrease	"
Total amount shipped to date	292,662 "
Same time last year	281,407 "
Increase	11,255 "
Decrease	

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending Nov. 25, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	11,844 15	505.671 17
Shipped South	48,563 00	1,124,277 09
Total	60,407 15	1,627,949 06
For the corresponding time last year:		
Shipped North	8,664 17	654,797 13
Shipped South	36,454 05	1,638,010 16
Total	45,119 02	2,292,808 09
Increase	15,288 13	
Decrease		664,859 03

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Nov. 25, 1871.

	WEEK.	SEASON.
North	54,860 19	1,444,350 02
South	9 956 13	301,515 07
Total 1871	64,817 12	1,745,865 09
Corresponding time in 1870:		
North	21,820 12	1,900.691 18
South	5,508 02	410,623 19
Total	27,328 14	2,311,315 17
Increase North	33,040 07	
Decrease North		456,341 16
Increase South	4,448 11	
Decrease South		109,108 12
Total increase 1871	37,488 18	
Total decrease 1871		565 450 08

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Nov. 25, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B.&O.R.R. Co Tons Cwt.	Total. Tons Cwt.
1871	14,211 15	25,505 09	39,717 04
1870	13,100 07	20,593 17	33,694 04
Increase	1,111 08	5,011 12	6,123 00
Decrease			

YEAR.

1871	643 919 09	1,121,847 18	1,765,767 07
1870	507,860 19	790 301 14	1,298,162 13
Increase	136,058 10	331,546 04	467,604 14
Decrease			

Cumberland Branch

WEEK.

	To C. & O. Canal Tons. Cwt.	To B &O. R.R. C. Tons. Cwt	Total. Tons Cwt.
1871	4,873 03	1,577 00	6,450 03
1870	367 13	1.397 07	1,765 00
Increase	4,505 10	179 13	4,685 03
Decrease			

YEAR.

1871	190,206 14	64,374 05	254,581 00
1870	83,883 12	109,498 12	193,382 04
Increase	106,323 02		61,198 16
Decrease		45,150 06	

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div. of Central Railroad of New Jersey for the week ending Nov. 25, 1871, and for the year 1871.

	WEEK.	YEAR.
Forwarded East of Mauch Chunk by Rail	29,411	1,162,900
Delivered at and above do.,	2,130	61,575
Forwarded East of do., by Canal	29,396	722,330
	60,938	1,947,106
Corresponding period last year—		
Forwarded East of Mauch Chunk by Rail	22,105	935,105
Delivered at and above do.,	1,089	41.828
Forwarded East of do., by Canal	25,292	758,861
	48,486	1,735,794
Increase on Railroad	8,348	247,842
Decrease " "		
Increase on Canal		
Decrease " "	4,104	36,530
Of the above there was transported on account of—		
Lehigh Coal Nav. Co.	19,454	565,174
Wilkesbarre Coal & Iron Co.	15,899	783.143
	35,356	1,348,318
Corresponding period last year—		
Lehigh Coal Nav. Co.	14,070	260,310
Wilkesbarre Coal & Iron Co.	13,431	563.879
	27,501	824,189
Increase	7,854	524 129

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Nov. 25, 1871.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	37,375	991,787
By Railroad, East	9,597	308.525
" " West	3,465	106,537
" " South	9,956	301,515
Total Tons	59,393	1,708,364

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	107	1,292,675
By Railroad, East,	17,529	408,985
" " West	4,420	78,355
" " South	5,508	410,624
Total Tons	27.564	2,191,139
Decrease	482,875	

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending Nov. 25, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	18,625 10	564.859 05
" Hazleton	41.710 19	1,295,843 14
" Upper Lehigh	83 04	2 343 01
" Beaver Meadow	16,765 03	470,694 06
" Mahanoy	9,333 18	492 486 15
" Mauch Chunk	56 00	7.888 08
" Sullivan & Erie	547 13	8,096 12
Total Anthracite	87.122 07	2,842,212 01
Bituminous Coal from all sources	2,037 00	354.517 08
Total by rail and canal	89,159 07	3,196.729 09
Same time last year	66,253 01	3,581,735 10
Increase	22,905 06	
Decrease		385,006 01
Forwarded East from Mauch Chunk by rail	61,386 07	2,173 468 09
Same time last year	47,245 00	2,.81,625 05
Increase	14,141 07	
Decrease		605,158 16

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	61,386 07	2,176,468 09
Forwarded North from L. & B. Junction	11,064 10	306,916 19
To N. C. R. R., at Mount Carmel		4,765 19
To L. & S. R. R. at Packerton for rail	229 10	7,162 10
Delivered at M'h Chunk	48 18	1,336 16
Delivered on line of road above Mauch Chunk	616 05	12,308 02
Delivered above MauchChunk for use of L. V. R.R.	1,721 19	50,223 02
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do. for canal	7,611 01	204.553 08
At M.Chunk for canal	4,443 17	7r,382 06
Total Anthracite	87,122 07	2.842,212 01
Bituminous Coal	2,037 00	354,517 08
Total all kinds	89,159 07	3,196,729 09

This report includes all Bituminous Coal carried over the Lehigh Valley and P. & N. Y. Railroads from December 1st, 1870, to date.

Company Coals.

Dec, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Chest
*Scranton at E. Port	- —	- —	- —	- —	- —	- —
*Pittston at Newburgh	5 10	5 10	5 30	5 40	5 80	5 10
*Lackawana at Rond't	5 10	5 10	5 30	5 60	5 95	5 10
Wilk'b're at Hoboken	4 00	4 25	5 00	5 00	6 00	4 75
Old Co. Lehigh at Pt John'n	5 75	—	5 75	5 75	6 25	5 50
Lehigh at Eliz. Port	5 75	—	5 75	5 75	6 25	8 50

For freights to different points see "Freights."

* To contractors.

* None to sell.

Line Prices for Coal Nov, 1871,

	Lump	Broken	Egg	Stove	Ches'.
At Mauch Chunk	4.00	4.00	4.00	4.25	3.00
*Wilkesbarre	3 75	3.75	3.75	4.00	3.00

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, Dec. 2. R. A.	W. A.	AT PHILADELPHIA, Dec. 2. R. A.	W. A.
SCHUYLKILL.				
Lump	$- —	$- —	- —	- —
Steamer	4 80	- —	- —	4 50
Broken	4 80	- —	- —	- —
Egg	- —	- —	5 00	4 75
Stove	6 25	- —	5 00	5 00
Chestnut	5 00	- —	- —	- —
Pea	- —	- —	- —	- —
LEHIGH.				
Lump, (along side)	6 25	—	- —	- —
Broken	6 25	- —	- —	- —
Egg	6 25	- —	- —	- —
Stove	6 25	- —	- —	- —
Chestnut	5 25	- —	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 00@6 25		- —	- —
New England	"	—	- —	- —
Locust Mountain	W. A.	6 50	- —	- —
Honey Brook, Le'h	W.A.	5 50@6 25	- —	- —
Spring Mountain	" "	5 50@6 25	- —	- —
Sugar Creek	" "	5 50@6 25	- —	- —
Sugar Loaf	" "	5 50@6 25	- —	- —
Old Comp'y's.	" "	5 50@6 25	- —	- —
Cross Creek	" "	5 50@6 25	- —	- —
Room Run	"	5 50@6 25	- —	- —
Girardville	" "	—	- —	- —
McMichael	" "	- —	- —	- —
Shamokin	" "	5 25	- —	- —
Lykens Valley	" "	5 75	- —	- —
Broad Top	" "	5 25	- —	- —
Hill & Harris	" "	- —	- —	- —
Henry Clay	" "	- —	- —	- —
Powelton	"	5 25	- —	- —

*Dealers in these coals may be found in our advertising columns.

Prices at Baltimore—DEC., 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 60@5 85
Pittston and Plymouth, do	- —@5 60
Shamokin Red or White Ash, do	- —@5 60
Lykens Valley Red Ash, do	- —@6 30
Zerbe Valley	- —@- —
Trevorton	- —@- —
By retail, all kinds per ton of 2240 lbs.	7 00@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	- —@4 50
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f.o.b. at Phila	$ —
" Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

Dec, 1871.

George's Creek and Cumberland f. o. b. for shipping...$4 35@4 05

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 25@5 50
Lykens Valley	6 25@6 50
Shamokin Red or White Ash	5 50@5 75
Trevorton and Zerba Valley	- —@- —

Prices of Gas Coals.

Dec, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Duty, $1 25, gold Coarse	Slack.
Block House	$1 75 @-1 75	
Gowrie	1 75 @-1 75	

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse	Culm of Coal
Pictou	$2 25 @1 45	
Sydney	2 25 @- 80	
Lingan	1 60 @- 80	
Little Glace Bay	1 60 @1 00	
Caledonia	1 60 @- 80	

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	$7 00 @- —
Fairmount Gas Coal Co. of N. Y.	7 00 @- —
Despard Coal Co.	7 00 @- —
Penn	7 00 @- —
Newburg Orrel Gas	- —@- —
West Fairmount Gas Coal	7 00 @- —

AT PHILADELPHIA.

Powelton	$6 75

TO NEW YORK.

Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 37½
Port Caledonia	3 37½
Little Glace Bay	3 25

Prices of Foreign Coals.

Dec, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@- —
" Cannel	10 50@12 00
" House "	— —@16 00
" Orrel	12 00@14 00
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$16 00@17 50
"Cannel, "	18 00@20 00
Per ton 2,000 lbs. delivered.	

Freights.—Dec. 1871,

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadel'a.	Anthracite. From East Port, Port Johnston, and Hoboken.	Anthracite. From Newburg...	Anthracite. From Rondout...
Amesbury			$2 50	$1 95		
Bangor	$2 75		2 25	2 00		
Bath	2 75	2 65	2 35	- —		
Boston	2 60	2 60	2 25	1 85	180	1 85
Bridgeport	2 25	2 30		1 10	1 10	1 25
Bristol		2 60		1 50		1 50
Cambridgeport			2 35	1 85		
Derby				1 25		
Dighton	2 30	2 35		- —		
East Cambridge				2 25		
Fall River	2 25	2 30		1 40	1 40	
Hackensack				140		
Hartford	2 75	3 00	2 40	2 00		
Jersey City		2 40		55	70	
Middletown				1 25		
Mystic				1 25		
New Bedford	2 50	2 35	2 00	1 50		
Newburyport	2 75			2 50		
New Haven	2 25	2 30		1 10	1 10	
New London	2 25	2 30	1 95	1 25		
Newport				1 40		
New York	2 00	1 90	1 40	55	70	
Norwalk		2 30		1 10	1 10	
Norwich	2 25	2 30		1 50	1 40	
Pawtucket	2 50	2 50	2 15	1 00		
Portland	2 50	2 60	2 40	1 70		
Portsmouth, N. H	2 75	2 75		2 00		
Providence	2 25	2 30	2 00	1 50	1 50	
Rockport						
Saco	2 75		2 65	- —		
Sag Harbor				1 20		
Salem	2 60	2 65	2 25	2 25		
Stamford				1 10	1 10	
Stonington				1 25	1 20	
Taunton				2 00		
Warren			- —	1 00		
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cocksackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			50	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$2 10
For reshipment	2 00

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 92
C. R. R., N. J., Phillipsburgh to Elizabethport	1 88
Shipping expenses at Elizabethport	75
Wharfage	10
Total	$2 15

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 92
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 88
Shipping expenses	25
Wharfage	10
Total	$2 15

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 92
Morris & Essex R. R. Phillipsburgh to Hoboken,	1 88
Shipping expenses	20
Wharfage	16
Total	$2 15

TO SOUTH AMBOY.

L. V. R. R.	92
B. & D. R. R. / Cam. & Am R. R.	1 81
Shipping Expenses	35
Total	$2 08

PENN HAVEN TO ELIZABETHPORT.

L. V. R R Penn Haven to Phillipsburgh	90
C. RR. of N. J. Phillipsburgh to Elizabethport	126
Shipping expenses	25
Wharfage	10
Total	$ 2 51

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	Toll..$1.35	Freight..95c....	$2 30
" Port Carbon				....
" Port Clinton	" 1.88	" 55c....	2 23

Drawback 15 cents during August.

NEW YORK.

From Schuylkill Haven	Toll..1 10	Freight..$2 00..	$3 10

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA

Lehigh Canal	$ 80
Freight and towage	1 10
Total	$1 90

TO NEW YORK.

Lehigh Canal	$1 57
Morris Canal, Freight, Towing	208
Total	$2 65

TO JERSEY CITY.

Lehigh Canal	$ 44
Morris Canal, Freight	2 06
For re-shipment	2 50

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 57
Delaware Division Canal	38
Delaware and Raritan Canal	
Freight	1 25
Towage	20
Total	$2 60

MARKET REVIEW.

FOR THE WEEK ENDING DEC. 2, 1871.

IRON.—The market for Scotch Pig remains inactive, but the stock is light, and prices are supported—200 tons Glengarnock sold at $35.50, time, and 150 do. Summerlee, on private terms. American meets with very little inquiry, but prices are without change. We quote: No. 1, $36@37, and No. 2 $34@35. New rails have been rather quiet, but are steady at the quotations noted in our last. Old continues in modest request, and we notice further sales of 1,200 tons Double-headed and T, part at $42.50 currency, cash. Refined Bar continues very strong at the advance noticed in our last, the tendency being to still higher prices; it costs now to lay down from Liverpool $82@83 currency at dock. The second advance in Burden's mentioned in our last, which we did not give, was only on their "H. B. & S."—viz., $2.50 per ton on ordinary sizes Round and Square, Extra sizes, Flats, Ovals, Half Ovals and Half Rounds, an advance of $12.50 in all in the two announcements. "Burden's Best" was not further changed. Swedes Bar, squares, is nearly out of market. Common Sheets continue very scarce, and bring full prices; No. 24 sells at 5½c. and No. 27 at 5¼@6c.; a further lot of 1,000 bdls. American R. G. and 1,000 do. Galvanized sold on private terms. Sound Russia Sheet is held at 18c. gold.

LEAD.—The government sales interfere with the regular business in Pig, and the market is dull at $5.90@5.95 gold for ordinary Foreign, which is below cost laid down here. Bar 9¼c., Sheet and Pipe 10¼c., and Tin-lined Pipe 15c., less 10 per cent. to the Trade.

COPPER.—New Sheathing is firm at 31 cents. Bolts and Braziers' 34, Bronze and Yellow Metal Sheathing 24, and Y. M. Bolts 25. Ingot is less active, but, with small offerings, prices have further advanced ¼ and ½ cent per lb. Sales have been made of 400,000 lbs. Lake at 24¾@25 cents, cash, and 25 for December and January delivery, closing at 35 for spot lots.

STEEL—Continues steady at our store quotations.

SPELTER—Is quiet but firm at 6¾@6⅞ cents, gold, as to brand, etc. Domestic, 10 cents, currency.

TIN.—The London market continues to advance, I. & F. being quoted by telegraph £153, and Straits £150. These advices strengthen holders, who, in the face of a limited demand, have further put up their prices, Straits being held firmly at the close at 38@38½ cents, English 37, and Banca 43. 15 tons English sold at 36½@37 cents, and 50 slabs Straits 37¾. Plates are in fair demand at full prices. Sales have been made of 500 bxs. I. C. Coke, 10 by 14, at $8 25; 2000 do., 14 by 20, for future shipment, $7 87½@8, gold; 1000 do. and 250 do., 10 by 14, on private terms.

ZINC.—Sheet continues scarce on the spot, and full prices are maintained for lots as wanted for consumption. 200 casks Mosselmann sold from agent's hands, forward delivery, at 8½ cents, less 4 per cent., and 20 casks from store, 10 gold, and 11@12, currency. Manganese black oxide, 4½; Manganese Pyrolusite, 5½.

The following intelligence, which we have received from English sources, exhibits the amount of iron, steel, etc., imported into the United States from Great Britain for the month of October, 1871, as compared with the corresponding month for 1870:

	Tons—1870.	Tons—1871.
Iron and steel, pig and puddled iron	12,875	24,696
Bar, angle, bolt and rod iron	4,924	4,522
Hoops, sheets, boiler and armor plates	4,707	3,089
Railroad iron of all kinds	28,219	52,174
Castings	722	764
Steel, "unwrought"	1,785	2,618
	Cwts.	Cwts.
Tin, plates	106,654	155,241

It will be observed, in analyzing the above figures, that our imports of iron and steel for this year are nearly 100 per cent. in access as compared with the corresponding period in 1870; the same excess is manifested in our importations of railroad iron. Our demand for imported tin plates does not increase in the same ratio, the figures for which item indicate only an advance of 25 per cent. over the supply furnished last year. Now, while these figures evince an increasing demand for these important products, and also that such demands are an indication of largely increased advancement in our manufacturing interests, yet we cannot but deplore the facts which such figures illustrate. We have resources at our door which are equal in quality and far superior in quantity in their natural supply to the productions of our foreign neighbor, and why, in the face of these facts, we should double our importations of these products instead of diminishing them in the same ratio, is a question we will leave open to our theoretical protectionists. An English contemporary, in a review of the yearly London Trade Circular, from which we extracted the above figures, takes occasion to remark to the effect that such an exhibit is a subject for congratulation—a view in which we heartily concur.

METALS.

NEW YORK, Dec. 2, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices
Pig, Scotch No. 1, ℔ ton	34 00@40 00
Pig, American, No. 1	36 00@37 00
Pig, American, No. 2	34 00@35 00
Pig, American, Forge	33 00@34 00
Bar Refined, English and American	80 00@— —
Bar Swedes, assorted sizes (gold)	82 50@ 85 00
	Store Prices, Cash.
Bar, Swedes	107 50@120
Bar, Refined, ord'y sizes	90 00@ — —
Bar, Refined, 1½ to 6 by ¼ @ 5-16 inch	— —@ 95 00
Bar, Refined, 1 & 1¼ by ¼ & 5-16	— —@ 97 50
Bar, Refined, 2¼ to 3 Round & Square	— —@ 97 50
Scroll	107 50@137 50
Ovals and half-round	107 50@125 00
Band	— —@102 50
Horse Shoe	105 00@115 00
Rods, ⅜ to 3-16 inch	85 00@130 00
Hoop	112 50@160 00
Nail rod	5½@— 6
Sheet, Russia, as to assortment (gold)	17½@ 18
Sheet, Single, D. and T. Common	—5 @—
Sheet, D. and T. Charcoal	—6 @—5 ¾
Sheet, Galv'd, Nos. 14 to 26 27½ to 31 ct. dis.	12@14 6½
" " Nos. 27, 28, and 29 27½ to 30 ct. dis.	15@18c ℔
Rails, English (gold), ℔ ton	57 00 @59 c ℔
Rails, American, at Works in Pa.	70 00 @71 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3¼ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11 @— 13
English German (2d and 1st quality)	— 10½@— 12
American Blister "Black Diamond"	— @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 9 @— 10
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 31
Copper Bolts	— @— 34
Copper Braziers, 16oz. and over	— @— 34
Copper Nails	— @— 39
Copper, Old Sheathing, &c. mixed lots	20 @— 21
Copper, Old, for chemical purposes, 14@16 oz.	23½@— —
Copper, American Ingot	24¾@— 25
Yellow Metal, New Sheathing & Bronze	— @— 24
Yellow Metal Bolts	25 @— —
Yellow Metal Nails	— @— 24

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb	6 12½@ 6 62½
Plates, Domestic p. lb	— 7 @— 11

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$— — @— —
Spanish (gold)	5 90 @5 95
German, do.	5 90 @5 95
English do.	6 00 @6 37½
Bar (net)	9 25 @— —
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	42½@43
Straits	38 @38½
English	37 @—

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 87½@9 25	$10 37½@11 00
I.C. Coke	7 75 @8 75	9 25 @10 25
Coke Terne	6 50 @7 62½	7 50 @ 9 25
Charcoal Terne	7 87½@8 50	9 75 @10 25

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DEPARTMENT OF POPULAR SCIENCE.

Free Lectures for the People.

The course of the Cooper Union was opened on Saturday night with a lecture by R. W. Raymond, on the Great American Geysers, and will be continued on the Saturdays of December, January, February and March. The lectures on the next three Saturdays will be given by Dr. A. J. Ebell, as follows:

I. The Birthday and Early Life of our Earth. A Birdseye view of Historical Geology.

II. The Structure and Life of Coral Islands.

III. Architecture and Life of Vertebrated Animals.

Saturday, December 30th, will be "An Evening with the Poets," by Sidney Woollett, Esq.

It will be seen that the course during December is to be mainly devoted to the knowledge of the earth upon which we live. We understand that the lectures of January will take up "the Body *in* which we live," Dr. Willard Parker being the lecturer for that month. February will be occupied with political economy, social topics, etc., or the knowledge of "Society *under* which we live;" and March will complete the round with various popular presentations of "Science, Art and Industry, *by* which we live." The classification is fanciful, but good in philosophy; and we do not doubt that it will be excellently justified by the lectures themselves. The audiences at the Cooper Union are such, in size, attention and intelligence, as any man might be proud to address; and the managers (particularly Mr. Abram Hewitt, the efficient secretary) of the Institution have shown much wisdom in choosing a range of topics for the lectures which best combines interest with instruction.

Dr. Ebell is one of the best talkers on Science in the country. Whoever goes to hear him will find that the free admission is a measure of the generosity of the entertainers, not the poverty of the entertainment.

Notes on Indiana Block Coal.*

From the careful explorations of Prof. E. T. Cox, State Geologist of Indiana, and of Dr. J. W. Foster of Chicago, supplemented by examinations made by Mr. Smith himself confirming these facts, the extent of the block coal field south has been satisfactorily determined. It extends through the State of Indiana southward to the Ohio River. This statement a few years ago had not been proved, but at the present time borings have been made on the banks of the Ohio, and the identity of the veins established. The northern limit is in Warren County, the boundary of the coal basin. This portion of the field is about being examined by the State authorities. In width the block coal region extends from three to ten miles.

The following description is from Prof. Cox's Geological Report of Indiana: The name "Block Coal" is used by miners to designate a variety of non-coking bituminous coal, which was first discovered on the western border of the Appalachian coal field, along the Mahoning coal field in the State of Ohio, where it is also extensively used in blast furnaces, direct from the mine. Block coal has a laminated structure, and splits readily into sheets, that have their surfaces covered with a dull, soft, fibrous, carbonaceous matter resembling charcoal; while on the other hand, it is difficult to break in the opposite direction to the laminæ; and this fracture exhibits a splinty structure, marked by alternate layers of dull and shining bright coal. In coking it scarcely swells or changes form, and never cokes or runs together. It is this latter character which gives to the block coal its peculiar value as a fuel for smelting iron ores, while it has sufficient bitumen in the form of gaseous matter to render it highly inflammable; and the blocks retain their shape until burned to ash in such a manner as will admit the ready passage of the blast and flame through the entire mass of fuel, ore, and flux. On the other hand, the bituminous coking coals, of which the Pittsburg coal may be taken as a type, swell and run together so that the blast cannot force the flame through the contents of the furnace, and the whole mass becomes chilled for want of sufficient heat to melt the ore.

As a blast-furnace coal to smelt iron ores, it has been amply tested in the five furnaces that are now using it in Clay County. The pig-iron made at the Clay County blast-furnaces from Iron Mountain and Lake Superior ores by the use of block coal as a fuel commands from $2 to $3 more per ton at the furnace than the same grade of pig iron made in Kentucky and Ohio will command in Indianopolis. The blast-furnaces making pig iron with raw block coal are all hot blast; the total working capital employed at these furnaces is about $600,000. Combined, they consume daily 300 tons block coal, 150 tons Lake Superior and Iron Mountain ore, 50 tons limestone for flux. The daily make of iron is about 110 tons. The number of men employed, not including coal miners, is about 200.

Red hematite and magnetic oxide of iron from Lake Superior and Missouri are the ores principally used at Brazil. The average quantity of block coal used per ton of iron in the stated period was 4042 pounds. The usual charge for making No. 1 foundry iron at the Brazil Blast Furnace consists of 1545 pounds, of a mixture of Iron Mountain specular iron ore, Lake Superior red oxide and magnetic iron ore, scrap and mill cinder, 425 to 475 pounds of limestone, 1800 pounds of block coal. The ore yields about 68 per cent, and the furnace is tapped three times in 24 hours.

The Alabama and Chattanooga Railroad exhibited and presented to the Institute some specimens of iron ore, building stone, and coal from the line of their road.

[* Abstract of a Paper read by T. Guilford Smith, C. E., before the Am. Inst. of M. E.]

Notes on the Increase of the Iron Manufacture.

I begin this paper by submitting the number of blast furnaces and amount of pig-iron annually made in the valley of the Lehigh at the present date:

	Furnaces.	Tons.
Parryville, the Carbon Iron Co	3	28,000
Coplay, Lehigh Valley Iron Co	3	28,000
Hokendauqua, Thomas Iron Co	4	52,000
Lockridge, Thomas Iron Co	2	21,000
Catasaqua, Lehigh Crane Iron Co	6	65,000
Allentown, Allentown Iron Co	4	30,000
" Allentown Rolling Mill Co	2	18,000
" Lehigh Iron Co	1	9,000
Bethlehem, Bethlehem Iron Co	3	30,000
Hellertown, Saucon Iron Co	2	18,000
" North Penn Iron Co	1	10,000
Colerain, Colerain Iron Co	1	10,000
Uhlers, near Easton	1	9,000
Glendon, Glendon Iron Co	5	50,000
	38	378,000

The following furnaces are building and are nearly ready:

Emaus	1	9,000
Colerain	1	9,000
Allentown Iron Works	1	9,000

Iron ore principally used is Hematite from Lehigh, Berks and Northampton counties, about 70 per cent., and about 30 per cent. from the mines of New Jersey and part from the South Mountain, Pennsylvania and Magnetic ores. Coal used is from the Lehigh, anthracite mines, and from the Wyoming and Schuylkill region. The limestone is from the immediate vicinity of the furnaces. The first successful anthracite iron on the Lehigh was made in a 12 foot box furnace, at the rate of about 50 tons per week, in July, 1840. A small quantity was made at Pottsville in the Winter of 1839, but the furnace did not succeed, was blown out, and as far as the writer knows the furnace at the Lehigh Crane Works, in Lehigh county, was the only anthracite furnace in blast during the year 1840. Now, I presume, the quantity made in the United States with anthracite coal must be fully one million tons per annum.

The chief difficulty I have experienced in the manufacture of pig iron in our part of the country, is the want of experience in the men employed, as well as the difficulty of managing labor generally, more especially since the breaking out of the unfortunate war in 1861. In my opinion it should be one of the chief studies of iron men, as well as manufacturers generally, to continue and use machinery as a substitute for manual labor, as it can be shown that of the cost of making pig-iron 96 per cent. consists in labor. The abundance of coal and iron ore in this country justifies the opinion that the day is not distant when the United States will have to supply the world with the great bulk of its iron and steel, as it is now a well established fact that old countries do not possess equal iron resources in point of territory, and in many of them the resources they had have been greatly exhausted. If we notice the increase in the consumption of iron in the last one hundred years, and the increased ratio of consumption from year to year, we shall reach the conclusion that in fifty years from now it will require a large country, with large resources, to meet the wants of the world, and I know of no country that is likely to fill the wants like the United States; therefore, a large portion of our mines to North, South, East and West will be called into requisition more and more from year to year, and prosperity may be expected if our Congress will only let well enough alone. In view of this, we ought to bring up our young men, well educated for the purpose, and impress upon them the need of economy in every department of the iron and steel manufacture, as it contains so many ramifications that a small waste in each of them will soon sink a large capital, as no ship, however large, can sustain many leaks.

W, Wilkinson writes Dec. 6, 1791, from the memorandum of Wm. Reynolds, of Coalbrooksdale, England, that in that year England and Wales had 73 coal furnaces making 67,548 tons of iron, an average of 925 tons per annum for coal furnaces. Scotland had then 12 furnaces, making 12,480 tons per annum, or 1,040 tons per furnace. England had then 20 charcoal furnaces, making 8500 tons or 425 tons per furnace yearly. Scotland had 2 charcoal furnaces making 1000 tons or 500 each yearly. England then imported from Sweden and Russia at the rate of 70,000 per annum of iron, at the rate of £35 per ton. Previous to the Revolutionary war, England imported a large supply of iron from New Jersey, Maryland, Virginia and Pennsylvania. Now England, after a lapse of only eighty years, makes about 5,000,000 tons per annum. In 1840, when the writer of this commenced making iron in the Lehigh Valley, Pa., the whole make of the United States did not exceed 285,000 tons per annum. In 1870, only thirty years later, the amount of iron made in this country was seven times that amount—about 2,000,000 tons—and I do not think it a vain prediction to say that in the year 1890 the production of this country will be fully double the amount.

The Eureka and Idaho.

The Grass Valley *Union* contradicts some recent statements of a correspondent of this journal, regarding these two mines. The *Union* says that the chimney of the Eureka never has passed into the Idaho (as did our correspondent) but denies that the proprietors of the latter mine have ever circulated the story—that is, the managers or large stockholders—though "some one individual stockholder of the Idaho may have advanced the theory of one chimney." The *Union* also says that the stock of the Idaho is owned to the extent of 2550 out of 3100 shares, in Grass Valley; and that only one monthly dividend of $31,000 has been made. It confirms our correspondent's statement that the stock is saleable at $300 per share.

The points of difference indicated are not of great importance, and relate to things about which it is quite easy to be mistaken. A matter in which we earnestly trust the *Union* is right, is the *Union's* confident opinion, in which "all intelligent and experienced miners who know the ground and who have examined the appearances of the ledge agree," that pay-rock will again make its appearance in depth, in the Eureka mine.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

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The Meeting of the Institute.

THE Troy meeting of the American Institute of Mining Engineers was a great success. It was well attended; its sessions were interesting and profitable; it brought together an intelligent body of men to revive old friendships and form new ones; and it produced upon the public generally, and particularly upon persons engaged in practical mining and metallurgy a decided impression of the vigor and usefulness of the Institute.

This unquestionable triumph was won in spite of some drawbacks. The city of Troy, though admirably suited to such a gathering, is distant from the residences of the original members of the Institute—an objection which has now been removed by the election of a considerable number of members and associates from the vicinity. We missed, however, many faces which were present at Wilkesbarre and Bethlehem, and especially those of Messrs. ROTHWELL and COXE, two of the founders of the Institute. The venerable President, Mr. DAVID THOMAS, was present, to the great satisfaction of all, and the indefatigable Secretary, Mr. MARTIN CORYELL, was at his post as usual. A meeting of the Institute would scarcely be recognizable without him.

No one who looked upon the earnest and active engineers collected at this meeting could fail to be struck by the predominance of young men. It is into the hands of wide-awake, progressive, educated young men that the control of American industries is rapidly passing. The gray heads among them seemed to gain new youth from the association; and the tone of all proceedings was, in consequence, eager and hopeful, though not wanting in caution or dignity.

Previous meetings, held in the neighborhood of the coal regions, have been largely occupied with the subject of coal-mining; this one was most appropriately devoted, in the main, to iron; though several important papers were presented concerning other branches of the profession. The interesting visits to the blast-furnaces, rolling-mills, and Bessemer works, and the delightful excursion to the magnificent iron mines near Port Henry, on the shore of Lake Champlain, will never be forgotten by those who participated in them.

The report of the proceedings in another column, and the papers which we shall publish in this and succeeding numbers of our journal, give for the benefit of absent members and associates as good a representation of the meeting as could be expected. What cannot be thus given is exactly what is most charming and perhaps most profitable in such occasions, namely, the cordial good fellowship, the rapid question or repartee, and that most fruitful form of discussion which is rife, after adjournment, when the assembly breaks up into knots and groups, each keenly following up the topic which interests it most. This is the best sign of life; and this notably characterized the Troy meeting. So long as such a spirit animates the American Institute of Mining Engineers, it will continue to grow and prosper.

Electricity and Rocks.

READ BEFORE THE AMERICAN INSTITUTE OF MINING INGINEERS BY R. W. RAYMOND.

There is much vague theorizing about the connecnection between electrical currents or discharges and the formation of mineral deposits, and those who substitute the word magnetism for electricity mean probably the same thing. There is no need of being exact when one is explaining things on a grand scale, and without reference to the details—that is to say, the facts!

In a brief treatise on mineral deposits, contained in my report of 1870 on mines and mining, I have intimated my view of the limits to which electrical theories of vein phenomena should be confined—namely, those of chemical reactions, either taking place in vapors or solutions of mineral substances, and resulting in precipitation, or occurring in the permeable contents of mineral deposits, already once mechanically or chemically precipitated, and resulting in varied metamorphosis. In the latter case, as well as in the former, the process, strictly speaking, involves the presence of vapors or liquids; since this is a condition of all chemical reactions. The effects produced, aside from such as I have described, by the mere transmission of magnetic or electrical currents through solid rocks, I believe to be trivial and rare. Mr. DARWIN, in his "Voyage of the Beagle," describes the vitrified siliceous tubes of La Plata, caused by lightning, entering loose sand. In the second volume of the "Geological Translations," referred to by the same author, there is an account of the similar formations, called fulgurites, occuring at Drigg, in Cornwall; and another case is described by Ribbentrop, in Germany. I quote a part of DARWIN'S description

"Four sets entered the sand perpendicularly; by working with my hands I traced one of them two feet deep; and some fragments, which evidently had belonged to the same tube, when added to the other part, measured five feet three inches. The diameter of the whole tube was nearly equal, and therefore we must suppose that originally it extended to a much greater depth. These dimensions are, however, small, compared to those of the tubes from Drigg, one of which was traced to a depth of not less than thirty feet.

["The internal surface is completely vitrified, glossy and smooth. A small fragment exhibited under the microscope appeared, from the number of minute entangled air, or perhaps steam bubbles, like an assay fused before the blow-pipe. The sand is entirely, or in greater part, siliceous; but some points are of a black color, and from their glossy surface possess a metallic lustre. The thickness of the wal of the tube varies from a thirtieth to a twentieth of an inch, and occasionally even equals a tenth. On the outside the grains of sand are rounded, and have a slightly glazed appearance. I could not distinguish any signs of crystallization. In a similar manner to that described in the Geological Transactions, the tubes are generally compressed, and have deep longitudinal furrows, so as closely to resemble a shriveled vegetable stalk, or the bark of the elm or cork tree. Their circumference is about two inches, but in some fragments, which are cylindrical and without any furrows, it is as much as four inches. The compression from the surrounding loose sand, acting while the tube was still softened has evidently caused the creases or furrows. Judging from the uncompressed fragments, the measure or bore of the lightning (if such a term may be used) must have been about one inch and a quarter. At Paris, M. HACHET and M. BEUDANT succeeded in making tubes, in most respects similar to these fulgurites, by passing very strong shocks of galvanism through finely powdered glass; when salt was added, so as to increase its fusibility, the tubes were larger in every dimension. They failed both with powdered felspar and quartz. One tube, formed with powdered glass, was very nearly an inch long, namely, 0.982; and had an internal diameter of 0.919 of an inch. When we hear that the strongest battery in Paris was used, and that its power on a substance of such easy fusibility as glass was to form tubes so diminutive, we must feel greatly astonished at the force of a shock of lightning, which, striking the sand in several places, has formed cylinders, in one instance at least, thirty feet long, and having an internal bore, when not compressed, of full an inch and a half; and this in a material so extraordinarily refractory as quartz!"

It is unnecessary to dwell upon the power of electricity thus manifested. It is manifested to us in several instances where houses are struck by lightning, and metallic objects are instantly melted by the surcharging current. What I wish to point out is the comparative rarity of such electrical effects in nature, and particularly in ore deposits. We do not find in these, as a general rule, any traces of vitrifying fusion, and we may fairly conclude that they are not particularly liable to this form of electrical action. It has, however, occurred to me that some puzzling cases in mineralogy might be due to this cause. Every mineralogist now and then encounters specimens sincerely alleged to be native, *i. e.*, in a natural state; but which he recognizes as the products of more or less perfect fusion. In most instances, no doubt, the fusion has been artificial, and the specimens are really forge or furnace products. Sometimes, however, they may be really native, and vitrified by lightning. Mr. DAUBRÉ, in a paper on meteorites in the "Annales des Mines" for 1868, remarks that lightning produces on the rocks of the earth a varnish which is not without analogy to that of meteorites. It occasions namely on certain rocks, particularly towards the summit of mountains, the formation of little drops, or of a glaze, to which DE SAUSSURE first called attention. It was on account of this resemblance that the savants to whom certain meteorites were submitted, which fell at Lucè in 1768, expressed their opinion that they were merely terrestrial stones vitrified by lightning.

But the rarity and comparatively insignificant extent of such phenomena, and the fact that nothing of the kind is observed as normal to mineral deposits, even at their out crops, warrants me in saying that electrical discharges of this character cannot be considered as active agents in the formation, filling or metamorphosis of veins. I pass to consider another class of electrical phenomena, namely, those

connected with the electric resonance or *bourdonnement* of mountains.

Mr. George S. Dwight, of Montdan, N. J., has communicated to me a recent case of this kind, personally observed by him on Grey's Peak, in Colorado, the highest summit of the rocky mountains. He ascended this peak with a party, about the 10th of June last, reaching the top at 2 P. M. Clouds had been gathering for an hour or two, and storms were in progress on the adjoining ranges, principally to the north and east, with heavy, rumbling thunder at brief intervals. "A strong wind from the west," says Mr. Dwight, "drove us to shelter behind a pile of stones some four feet high, which former visitors had erected as a screen. Behind this we crouched for some time, resting and viewing the gorges below. Presently one of the party arose to a standing position, and the instant his head and shoulders were elevated above the protecting line of wall, a hissing sound was heard by all of us. Our friend, with a possible suspicion of snakes, turned about in a bewildered manner to ascertain whence the noise came, and in a moment exclaimed, "Why, it is me!" His hair stood out, and the gold spectacles he wore about which there was doubtless some small amount of steel, crackled. At first we were disposed to laugh heartily at his experience, but as one by one we rose (there were four of us) and encountered the same phenomena, we thought best to beat a hasty retreat from a spot which might prove dangerous, and discuss the theory on a lower plane. Each of us experienced the sensation the moment we entered the draught or current from the west. The sound was as loud as that produced by the effervescence of ale from a partially uncorked bottle, and similar in character, though a trifling more whistling in tone. It was accompanied by a strong smell, as of sulphuric or muriatic acid fumes. We all felt the prickling sensation in our fingers also, and a certain exhilaration. These passed away as we descended, and I should say left us entirely within 250 feet of the summit."

Similar experiences are described by Mr. Fournet, in the *Comptes Rendues de l'Academie des Sciences* of 1867, and also by M. Henri de Saussure, in an article translated for the Smithsonian Report of 1868. The cases enumerated are seven in number, and the circumstances strongly resemble those above related, except that the odor perceived by Mr. Dwight and his companions, possibly due to the presence of ozone, is not mentioned in any of them, though in a number of these instances the electric tension appears to have been very great, and in almost all there was a crackling of the soil and rocks themselves, and a peculiar vibration of the staffs or *alpenstocks* of the last observers, called the *chant des batons*. Invariably, according to the authorities quoted, there was an attendant shower of hail or sleet at the summit of the mountain. M. Fournet mentions also an instance of nocturnal luminosity on the *grands Mulets* (Mount Blanc) as referable to a similar electrical condition.

De Saussure draws from the observations discussed by him the following conclusions:

1. The efflux of electricity from the culminant rocks of mountains is produced under a clouded sky, charged with low clouds, enveloping the summits or passing at a small distance above them, but without the occurrence of electric discharges above the place whence the continuous efflux is proceeding. It would seem, therefore, that when this efflux takes place, it sufficiently relieves the electric tension to prevent lightning from being formed.

2. The continuous efflux of electricity from the ground towards the clouds is not unconnected with the formation of vapor and probably also with that of the hail.

These electric phenomena seem not to be rare in high regions, though they are by no means frequent. Many persons accustomed to climb mountains, such as guides and hunters, have never observed the electric resonance; others have heard it but once or twice in their lives. But, as De Saussure acutely remarks, it is precisely on those days when menacing skies repel adventurers from the highest altitudes that the phenomenon manifests itself.

If we now inquire what are the permanent physical traces left by this electric tension or efflux, we find nothing at all. Gray's Peak is a locality within my personal acquaintance, and it bears the marks of far other agencies than this. The whole mountain for some hundreds of feet below the summit, appears to be a heap of broken fragments—sometimes erroneously called boulders. These have undoubtedly been produced by the exposed crags and ledges, and chiefly through the agency of frost. There is good reason to believe that this and many other summits have been frozen through, and that the summer thaws do not penetrate into their solid portions, except so far as disintegration may still be advancing year by year. I have been informed that the tunnel of the Baker mine, which is above timber-line on the Kelso Mountain, adjoining Gray's Peak, did not by penetrating two hundred feet, get beyond frozen ground. But neither the Baker mine nor the Stevens mine, which is about at an equal altitude on the McClellan Mountain opposite, nor any other of the numerous mines in our Western districts, situated at great elevations presents, so far as my observation goes, peculiar appearances referable to electricity as the cause.

In reply, then, to the assertion of electrical theories of vein-formation, it may be said that they lack the basis of direct proof, and that the indirect evidence of analogy is against them. We are acquainted with certain effects of electricity upon rocks; these effects we do not find in re-deposits; and what we do find there is referable to other cause. The prudent theorist will be content for the present, with electro chemical, not electro physical action, and confine himself to the study, in this department, of the possible existence and effects of galvanic currents in vein-contents, pending upon chemical reactions.

Polytechnic Association of the American Institute.

The following discussion ensued after the reading of Dr. Coar's paper, which is given elsewhere.

Mr. Stetson inquired what was the arrangement in the house.

Dr. Coar stated that the funnels are constructed very deep, with an air passage outside, connected with a chimney, for ventilation. At Prague it was used in the barracks. At Amsterdam the work is far advanced for trying it on an extensive scale.

The President said, that in a city like New York, with plenty of water, the ordinary system seemed preferable, as we have not yet any necessity for saving the sewerage. But in many places where the supply of water is small, the plan presented advantages worthy of consideration.

Mr. Fisher did not consider the system in New York as satisfactory. The gas rising into the houses from the sewers was sometimes very offensive and noxious.

Dr. J. V. C. Smith considered the proposed system too complicated for general use, although it would undoubtedly work well for barracks, or in similar positions. He stated the customs at Cairo, where a tub was placed in the back room of the dwelling, and emptied every day, and on Mount Lebanon, among the Druses, where deep wells are employed which require no attention. In no place in the world was a better system than in New York or Boston; and there was no necessity for any modification of it.

Mr. Stetson said it would not be necessary to go far from New York city to find places where the system is not satisfactory. Even here there is something to complain of, as the traps at the street crossings which sometimes are four inches deep, while in the houses the traps are only two inches deep, so that the first escape of the foul air, when forced back by high tides or heavy rains, is into the houses instead of the open air. If we go to Newark, we find a beautiful growing city with a good supply of water. Go up to Bellinth, and we find them pumping up this water from the Passaic river to send to Newark and Jersey City. Go a few miles further up, and we find the active and growing city of Paterson, and we see rows of machine shops, whose outhouses overhang the river. We remonstrate, and suggest that the people of Newark and Jersey City have to drink this water. But, says the Patersonian, if you place them anywhere else, it all washes into the river; and what can we do? There are plenty of such instances, and as the country is filled up, they will become more and more numerous. The people at Buffalo drink the water from the great lakes, after receiving all the filth of Cleveland, Toledo, and a host of smaller cities. We may be happily situated in New York, but should take a cosmopolitan view of the question, and consider the interests of humanity generally. The earth-closet is valuable in many respects. It is wonderful how completely a deposit of half an inch of fine earth—not sand or gravel—will absorb all the gases from fœcal matter. The earth can be used four or five times, being dried, before it becomes really offensive; and in the case of a gentleman living in Providence, an Irishman, who knew nothing about the apparatus, being employed to pass the earth through a screen, that it might be used over again, did so, without discovering what it was, showing how thoroughly it was deodorized. Earth-closets make the best system, not for this city, but wherever water-closets cannot be advantageously used.

The President stated that there was a prospect of carrying out the system of supplying pure water to Jersey City, described in his paper of last winter. We need to devise some system suited to the whole country. The cities upon the seaboard are an exception, for the arrangements generally throughout the country are of the rudest kind. It is of great moment, therefore, that the pneumatic system is to be tried on a large scale at Amsterdam, among an advanced and reading people, who will give it a fair trial.

Mr. Partridge said that, in four cases out of five, probably, the rising of gas into the houses in this city is the fault of the plumbers and not of the system or of the sewers; and he explained how it occurred. It being inconvenient in many cases to connect the waste-pipe from the sink and from the bath-tub with the main pipe above the trap, they are connected below; so that the only use of the trap is to send the current of foul air through the bath-tub and the wash-basin instead of through the water-closet. And lest this should be closed, there is provided another opening, through the overflow pipe of both wash-basin and bath-tub, which always affords direct communication from the sewer to the interior of our dwellings. Adjourned.

MINING SUMMARY.

California.

From the Grass Valley *Union* of Nov. 14:

DUTCH FLAT BLUE GRAVEL MINING COMPANY.

The San Francisco *News Letter* says of this company, noticed a few weeks ago in this paper: The Dutch Flat Blue Gravel Mining Company was incorporated this week, with the following trustees, viz.: L. A. Booth, Geo. D. Roberts, E. B. Dorsey, Wm. H. Raymond and J. B. Haggin. L. A. Booth, President; George D. Roberts, Treasurer; E. B. Dorsey, General Manager. The object of this incorporation is to work the Teaff, or Franklin gravel mine, in Dutch Flat, which the company bought for one hundred thousand dollars. This property has the reputation of being one of the most valuable on this coast, the deposit of blue gravel not only being richer, but more extensive than has been found elsewhere; the blue gravel is known to be over one hundred and thirty feet deep, while in the rich claims of Smartsville it is not more than half that depth. This claim has also great advantages in its favor, being directly along the line of the Central Pacific Railroad, with plenty of drainage or dump into Bear River, which

will drain the bed-rock. The company, we hear, intend to commence work on the claim immediately.

DAISY HILL MINE.

The Daisy Hill mine is located a little to the east of south from Ophir Hill. It is fast making a reputation for itself. There is a shaft down 150 feet on the incline, and from the bottom of the shaft a drift is run 100 feet towards the south. The ledge pitches to the west at an angle of about 45 degrees. At the mine there are two steam engines, which do the hoisting and pumping. Each of these engines have an eight-inch cylinder. The crushings from the Daisy Hill have been many and always good. Yesterday the proceeds of 42 loads of rock were brought into Grass Valley, and the gold was valued, in round numbers, at $6,500, or something in the neighborhood of $150 to the load. This mine is owned by an incorporated company, the stock being held in Grass Valley, with the principal place of business here.

COE MINE.

The Coe is looking well. Fine specimen rock, showing gold and rich in sulphurets, has of late been coming out of the shaft. The ledge is four feet thick, and the rock is of that kind known as ribbon rock. The shaft runs through 60 feet of this fine ribbon rock, and is down altogether 280 feet. The present appearance of the Coe mine is very healthy. The mill has been improved, of late, in amalgamating apparatus. We expect to chronicle, in a few weeks, a grand result from the Coe.

Montana.

The *Herald* of Nov. 9, has the following notes concerning the Helena Reduction Works:

In company with Mr. S. H. BOHM,—the enterprising banker and capitalist, who has the contract for the building of the Helena Reduction Works, and through whose instrumentality the project was originated—we, this morning, paid a business visit to the grounds, and made the following hurried notes:

We found the Superintendent, Mr. CHAS. RUMLEY, at his post, to whom we are under obligations for patient and intelligent answers to the many questions of "ye reporter." The grounds comprise about fourteen acres of land, laying in very desirable shape, and are enclosed by a substantially built fence. The carpenter work on the main building, which is 110x65 feet, is about finished, and has the appearance of great stability. It is 37 feet from the ground floor to the peak of the roof. The Cupel Room is 30x36 feet, and it will have a capacity of refining twenty-five tons of bullion per week. The "Charge" room is 80x16, and has a heavy plank floor. The brick work on the four stacks will be finished to-night, and they will be immediately lined with granite. The magnificent forty-horse power engine and boiler is about ready to start up steam. The engineers, J. F. BATEMAN and ELBERT HEADLY, are practical mechanics, and can build as well as run an engine. A "Gates Crusher," with a three stamp battery for crushing the ores, is being put up. All ores are crushed to a certain fineness before going to the furnace. The "Blower" has been ordered from California, and is expected to arrive in a few days. The well is down fifty feet, thirty of which has been blasted through solid rock. It now furnishes 1,000 gallons of water per day. The engine will use about 500 gallons every twenty-four hours. The well will be sunk a few feet deeper. One tank holding 500 gallons, and another 1,200 gallons, will be kept full constantly, to use in the emergency of fire, or for any other purpose. An abundance of hose will be bought, and every precaution taken against fire. The coal house is to be of wood, 45x100, and 20 feet high. It will hold 100,000 bushels of coal. Will be finished in one week.

Workmen are breaking ground for the office, distance 100 yards from the main building. It is to be built of brick, 16x48, one story high. It will be divided off as follows: Office, 16x20; assay office, 16x16; sleeping room, 16x12. In front of the building How's Improved Scales will be put up. The scales have just arrived from California, and will weigh ten tons. A large number of logs have been hauled for roasting the ores. There are now 1,200 bushels of coal on the ground, and 3,800 bushels more will be hauled by the 15th inst. Mr. N. SWEENEY has a contract for 50,000 bushels, and he will deliver 500 bushels per day after the 15th of this month, until his contract is filled. JOHN H. MING also has a contract for 50,000, which is to be filled by the 1st of March. Several hundred tons of ore have already been purchased, the first installment of which will be delivered on the grounds to-morrow. From thirty to forty men are constantly employed in different capacities, on and about the works. The Superintendent informed us that, without doubt, everything will be in readiness, and the furnace started up, by the first day of December; at which time we expect to give the works such a notice as the enterprise merits.

THE RADERSBURG MINES.

Extract from a correspondence in the *Herald* of Nov. 9.

Hearing much of the Radersburg ores, we have taken them in our line of travel, have been shown the principal mines, which are located to the west of Radersburg some two and a half miles, and have given existence to the little hamlet of Keatingville. To enter into a minute description of the various lodes now being worked and those partially developed in this section would require more time than I can at present command, and I shall only speak of them in general terms. KEATING and BLACKER, J. S. ALLEN, Judge WM. CLANCY, CHAS. G. HALLBECK, JACOB NAVE and FERGUSON & Co., are the principal quartz owners in the camp. The first firm mentioned are the owners of the well-known "Keating" lode, the ore from which has raised its proprietors from poverty to affluence in the short space of two years. These gentlemen, we learn, were "flat broke" a couple of seasons ago, with heavy debts weighing upon them. Since that time, by the aid of a fifteen-stamp mill, they have crushed out over *two hundred thousand dollars*, paid off a heavy indebtedness, and are now sailing along in the highway of fortune with a surety of immense wealth. They have other leads—the Ohio and Leviathan, both well defined, rich, and now being thoroughly developed. What they have accomplished has been achieved by hard and energetic labor, and without the aid of a single dollar of outside capital. This is not an exceptional case, by any means; for there are many other lodes which, though less developed, are paying fully as well as the "Keating." The famous "Left Hand Lode"—Judge CLANCY's property—bids fair to excel in richness any mine yet discovered in Montana. It is a free-gold lode, and makes the best showing of any I have yet seen. The lead is now worked to a depth of 50 feet on a 150 feet level, and has yielded a product of $22,000. The main shaft is down 90 feet, and at that depth shows a 2 feet crevice of the highest grade ore in the camp. Mr. REESE, foreman of the Left Hand, to whom we are indebted for courteous attention, including some magnificent specimens from the Left Hand, Gen. Washburn, and Don Juan lodes—belonging to Judge CLANCY—accompanied us through the mine, and frequently exhibited to our astonished gaze the glittering metal besprinkling the dusky vein of mineral. With his permission I appropriated a piece of ore, about two pounds in weight, which displays a bountiful sprinkling of pure gold over its entire surface. The aggregate of quartz taken from the surface to 50 feet down is (Mr. R. informs us) about 600 tons, and the average yield nearly $35 per ton. The main shaft is being pushed down night and day, and will be driven to a depth of 160 feet; when this depth has been accomplished, levels will be run each way and the ore started out for milling. Much unnecessary work has been done on the lead, or it so looks to the unsophisticated visitor. Two shafts have been sunk 50 feet deep within 100 feet of each other, and two levels have been run. The Left Hand was a short time since in litigation, as a spur of the "Keating," but, pending the trial, the Judge threw on an extra force of miners and, by a rapid and systematic development, exploded the idea and proved his vein a true one and independent of the adjacent mines. After leaving the Left Hand, we paid a visit to the Pennsylvania and Gen. Washburn. The former is well defined, is traceable for over 1,000 feet by developments, and has a crevice of 20 inches, which contains a dark yellow, heavy quartz, with more or less dirt veins. The lead is said to prospect well. The Washburn was discovered by Judge CLANCY last fall, and located for himself and partner, and the late Gen. WASHBURN, whose name it bears. It has a shaft of 70 feet and a large body of ore on the dump. Quartz men say it will prove a rival to any lode in this section when fully developed. We next took a look at the "Northeast" and "Don Juan"—both fine-looking mines and traceable their whole length. The tests from the former lodes yielded $36 per ton. We understand the Judge will soon erect a mill for the reduction of his various ores, and he certainly has an abundance in sight for two or three.

MINES NEAR PHILLIPSBURG.

From the *Scientific Press* of Nov. 18:

Phillipsburg, located about 25 miles above the mouth of Flint Creek, is one of the old silver camps of Montana, that has the promise of a successful future. In the spring of 1866 a party of prospectors from Idaho, under the leadership of CHAS. W. FROST, discovered this camp and organized the

FLINT CREEK MINING DISTRICT.

The rich specimens exhibited soon caused a stampede, which resulted in building the present town of Phillipsburg, and a population of about 1,500 from every prominent mining camp on the Pacific Coast, soon assembled here. A 10-stamp mill supplied with Wheeler's pans and all the necessary adjuncts of a Washoe mill, was speedily erected and the croppings of the "Hope" run through, which yielded from $50 to $100 per ton. The old story of the big fish eating the small fry was here re enacted, causing a general depression, and the town was left with a corporal's guard to take it in charge, the population scattering in all directions.

A couple of years since, COLE SAUNDERS, of Helena, organized a company and commenced developing the "Poor Man's Joy," "Kitty Clyde," and "Spreckled Trout" mines, which resulted in exhibiting rich bodies of base ore. He erected a couple of furnaces which met with poor success, no suitable fluxes being within reasonable distance. Nothing daunted by this failure, the company leased to the "Imperial Silver Mining Co.," under the management of Col. J. J. LYON, their mines and works, which are now being changed to a dry crushing mill (5 stamps); the ores to be roasted in reverberatory furnaces, chloridized, and amalgamated in barrels. It is believed that this process will meet the requirements in the case and the rich ores of the "Poor Man's Joy," "Salmon," "Speckled Trout," and "Franklin," will be worked up to 80 per cent. of fire assay value.

Should this be done, and it certainly appears possible, the old days of "'66" and "'67" will be revived, and Phillipsburg will become the leading quartz camp of the Territory.

We clip the following from the *Independent* of Nov. 11: At Highland all the arastras have suspended on account of the cold weather. Work upon the ledges is, however, pushed forward with as much activity as during the past summer. The placer miners are mostly at work, but will be compelled to shut down in a short time. At Moose Creek all placer mining has ceased, but Messrs. PARKS & DICKEY are still running their arastras successfully. They will employ a force of men on their mines all winter, and expect to take out enough paying ore to keep three arastras running the ensuing summer. But few companies are now running their mines at Pike's Peak and these will suspend operations in a few days. This is also true of the mines at Pioneer. In all the southern portion of the country, with the single exception of German gulch, mining has been virtually stopped for the season. As a general rule, the mines have paid as well this season as at any time for the past three years and bid fair to continue equally remunerative for several years hence.

STEELE'S DIGGINGS.

The *Independent* of Nov. 4 says:

These mines are situated about forty miles west of French gulch, near the head of Big Hole river. Mines were found seven or eight years ago, within twenty miles of Steele's on the opposite or west side of the river which have been worked more or less every year since. During the last season as high as $115 to the set of timbers has been taken out, and about fifteen or twenty men were engaged in the mines. The Steele diggings were discovered in the fall of 1869 on the bars of a small creek about five miles east of the Big Hole and on the French gulch and Bannack road. But one company have been working, as they took all the water that could be commanded without great expense. The diggings have paid very well, and will last for many years. There is a valley from 30 to 40 miles square, on the head of the river that produces the finest grasses; grand scenery surrounds it; the country abounds in game and the streams are full of fish.

Idaho.

OWYHEE DISTRICT.

From the *Avalanche* of November 11th:

The November term of the District Court, of the Third Judicial District, for Owyhee county, convenes in Silver City, Monday, November 13th.

Superintendent WALBRIDGE is taking a large amount of ore from the Oro Fino, south of the discovery shaft.

A. P. MINEAR is opening the Oro Fino, south of the discovery shaft. The mine is now yielding from ten to twelve tons of ore per day. The Ida Elmore mill is still running on tailings.

Additional ore-houses, snow-sheds, etc., are about completed on the Golden Chariot. Winter has somewhat interfered with the working of the mine.

The shaft on the Minnesota is now down 185 feet, and two drifts are being run on the vein.

Mr. JOHN JEWELL, of Grass Valley, has taken charge,

as foreman, of the Mahogany mine. Superintendent MINEAR intends to have the mine well opened before having any ore crushed.

About thirty men are now employed in the Shookum, and a large amount of ore in the yard will be immediately crushed.

MICKEY & Co. are actively prosecuting work on the Empire.

Five or six hundred tons of ore from the old works of the Poorman mine is now being worked at the Owyhee Company's mill, and it is paying well.

The shaft on the Morning Star is being put down as fast as possible, preparatory to running a 200-foot drift north.

The SANDS BROTHERS have just had a batch of ore crushed which paid thirty-odd dollars a ton.

The lower level in the South Chariot, which is being worked through the Mahogany, looks well, the ledge being about twelve feet in width.

The mines of South Mountain continue to prospect well. A toll road is being constructed from Camp Three Forks to Bullion City.

WELLS, FARGO & Co. shipped from Silver City, during the week ending Nov. 11th, 10 bars of bullion, valued at $13,739 04.

Colorado.

We clip the following items from the *Miner* of Nov. 16:

The Cliff mine has been placed in complete mining order, and we are happy to state that drifting into the mountain on this noble vein, has commenced. The mine is yielding ore of more than ordinary richness. An assay of average first class ore lately gave a yield of 930 ounces per ton. Thus the country in connection with the Cliff mine is drifting along toward a state of imperial prosperity. We are under obligations to the Superintendent, GEORGE MORSE, for specimens rich of native silver, taken from the Cliff.

The Stewart Silver Reducing Co. have shipped since our last issue,

Brick No.	Oz. Silver.	Fine.	Coin Val.
373	822	784	$ 833-26
374	922	812	968.00
375	724	820	767.58
376	1128	742	1082.20
377	984	740	941.49
378	897	748	867.49
Also Lead Bars,			
79	1198	360	557.66
80	1222	312	540.36
			$6,558.04

The mill is running mainly on Terrible second class ore.

Total bullion shipment for the week, in coin $6825.54.

The International Mill, Argentine, has shipped

Bar No.	Oz. Silver.	Fine.	Coin Val.
—	1118	753	$1094.50
—	1119	812	1171
			$2,265.50

SILVERPLUME LODE.

The following relative to the Silver Plume Mining Company has just been received:—I enclose you a certificate of assay of a piece of ore I personally took out of the Silverplume lode. It comes from a vein about two inches wide, and is rich enough to make a fine average for the whole lode. It is of course a picked specimen, but quite a large lot of the same is in sight. Colorado Assay office, Central city, Sept. 16.—I hereby certify that the specimen of ore taken from Silverplume lode, Griffith district, assayed for Professor CHARLES S. RICHARDSON, gave the following result:—Gold, none. Silver per ton, 2000 lbs., 2188 ozs. 02 dwts. Coin value, 2844 dols. 53-100. (Signed) E. E. BURLINGAME, Territorial Assayer.

The above assay we clipped from the last London Daily *News*, we congratulated our friends SNIDER and GRAY, and proceeded to ask them all about their mine, and the plan upon which they were working it, Col. GRAY replied, he feared we would laugh at their temerity, but they were running it without a Professor, nor was it propelled altogether by brute force and ignorance, but believing they had a good mine, ther wished to prove it, therefore opened their stopes, and after that tedious work was partially done, the ore extracted was sent to the Trenton Company's Mill, crushed and sacked; after many delays and troubles ten tons was sent to Swansea. This first shipment had to bear the expense of preparing the stopes even then, it was paying over their expectations; the mine then being in better condition for work, they commenced on the second shipment, which satisfied them of its real value as an investment, then they made contracts for pushing their work by continuing their second level and the opening and running a third level, this looks like work, and their prudence in testing the first work by actual expense and returns is well worthy of imitation. From the appearance and indications of the third level we predict it will be so favorable in its results that these very cautious gentlemen will continue making new lands until their territory is all paying them handsomely. The first level has all the time been pushed with vigor, and at this time shows some very superior mineral. The first and second levels are being prepared for a railway, and Mr. SNIDER is preparing the rails and cars, and will have them at work next week. The improvement will save in expenses and expedite the work, more than they themselves have an idea.

Everything we saw and heard about the management of the company was well done, and at less than half the expense usually incurred by less attentive management.

From the samples of ore we saw, the quality is surely improving, and the idea of a superior judge of it, to dress all the rock and have no third class ore, is the best arrangement which we have seen about any of the mines, and is a paying idea, and gives the dump a neat appearance with a large space, which is used for the preparation of timbers for the mine. The blacksmith shop, ore house, and coal house, are well constructed, and in the most convenient place, and the price at which these improvements were made, was not over the cost of the material; this we hope for the sake of our mining interests will be imitated.

BOULDER COUNTY.

The Caribou *Post* of Nov. 16 says:

Yesterday the second charge was put into the Kearsing & Patterson furnace, which is regarded as a trial of the furnace for the successful working of the Caribou ores. The Dayton mill, at Middle Boulder, will soon be buying ores, after which we hope to hear the last of a scarcity of money in the mining camps of Boulder county.

The west shaft of the Caribou mine, two hundred feet from the main shaft, is now sunk to as good pay as any portion of the mine, making three hundred feet in length on the vein in which the exploration shows no dead ground but an even crevice of the richest silver ore. The main shaft is constantly improving as depth is gained, and of the wonderful width and richness of the crevice, our readers are well-informed.

The Seven-Thirty is now worked by a level westward from the main shaft, on a vein of 18 inches of the highest grade ores. Heretofore this lode has been noted for the richness of its ores, but not for their abundance. It has been supposed by many, to be a westerly extension of the Caribou, but whether it is or not is a matter of no consequence. The owners are satisfied to have it rival that celebrated mine in the richness of ore obtainable.

There is much interest in the development of the Wabash lode by GEORGE C. CORNING & Co., who are able and desirous of erecting reduction works as soon as they become satisfied that the vein of their mine is permanent. The depth now attained is about 35 feet, and thus far it has proved regular and rich. We anticipate that the investments of Messrs. CORNING & Co., will result in great profit to themselves and benefit to the district. They are interested in many other Grand Island lodes, all selected with care, by experienced miners, and whose development will add greatly to the wealth of the country.

The Grand View Company have completed their buildings over the mine, and are again raising five hundred dollar ore. Delay in the completion of the mills on which they were relying for a market for their ores, has been a great disappointment to all the miners of these northern districts. But this season removes that obstacle to mining prosperity, it is hoped. In addition to the Dayton mill for a market, we hear that at the beginning of another season, on the completion of the railroad to Boulder City, it is in contemplation to establish an ore-market there, when cash will be paid for high grades, for shipment.

From the *Register* of Nov. 15:

The Sturtevant lode, MCKNIGHT, MISCHLER, & Co., owners, situate on the crown of Gold Hill, east from the Boulder county, is down thirty feet in the main shaft, and work is still progressing. Third-class ore assays $86 in gold, and $100 in silver, per ton. The prospects are good for a valuable mine.

Jo. IRWIN, WALTER STEPHENS, & Co., are working the Sweden lode. At a depth of 25 feet, it shows a crevice 5½ ft. wide, which assays $500 per ton, in silver. They have also made a new discovery on the summit of the Caribou Hill, 50 feet north of the Conger lode, which assays $82 per ton, in silver. At a depth of 14 feet it shows zinc-blende and carbonate of copper.

McFarland mountain north of Pomeroy's mountain, is becoming notorious over the discovery of a rich silver lode discovered and worked by MCFARLAND & BRO'S., late of Georgetown. It is now down 22 feet, showing a pay-streak 30 inches wide. The only estimate we have of its value, is an offer by KEARSING, PATTERSON, & Co., of $600 for about 40 tons on the dump. They have named it the Competition lode. By spring it may well be able to compete with the celebrated Caribou lode.

Among the new discoveries is the Wide Awake lode, situated on the Caribou Hill about 500 feet south of the Caribou. The crevice carries zinc-blende and galena. ANDREWS & Co., are the owners. Also the Manoa lode, named in honor of a fabulous city in El Dorado; LA GRANGE, owner. It is situated on Caribou Hill 100 feet north of the Conger lode, and shows a crevice 3 feet wide at a depth of 11 feet.

MR. BOYD is rejoicing over his new lode, the McCarty, named in honor of L. MCCARTY, proprietor of the Tremont House, Denver. At the depth of 11 feet it shows a crevice 5 feet wide, which assays $140 per ton, in silver, and is situated about 100 feet north of the Grand View on Caribou Hill.

The same paper says,

THE PEWABIC GOLD MINING AND TUNNELING COMPANY,

Whose tunnel we visited yesterday afternoon, is one of the working companies, deserving of especial mention. Their enterprise is one of considerable magnitude—the tunneling of the Pewabic mountain, situated at the head of Graham Gulch, about one and a half miles southwest from this city. A belt of very rich gold and silver veins are known to cross this mountain, running paralell to each other, and averaging one in every one hundred feet, or less, from the base to the summit, a distance of 2,300 feet. The mouth of the tunnel is a little above the celebrated Pewabic lode, and extends southward into the mountain 407 feet. It cuts, in its course, the belt of lodes referred to, at right angles, having already crossed seven veins, but at too little depth to find them of marked value, until now, in the breast of the tunnel, they are cutting one of great strength. We found seven feet in width of vein material already cut, and the south wall not yet reached. This lode is struck by the tunnel about 175 feet from the surface of the ground, following the dip of the vein. The ore is iron and copper pyrites, and argentiferous galena. An assay made on Saturday last, of an average of the crevice, by Prof. Burlingame, gave gold at the rate of $16.54 per ton, and silver $31.72, making $48.26 per ton. Considering the width of the crevice, and the vast amount of ore obtainable, and which may be inexpensively mined, this is certainly a very fine showing. The hill appears to be full of mineral, disseminated through the rock, showing all along the length of the tunnel. The company purpose to do no drifting at present on any mineral vein cut, however valuable the ore may prove; their present object being development—holding that the time has not yet come to work Colorado ores to the best advantage. When they are ready to erect works, they propose smelting. It is seen that silver is the predominating metal in the vein just reached, and doubtless, it will prove so in every mineral vein which their tunnel cuts, all the way through the mountain.

This company was organized in 1866, and has expended, in all, about $20,000 in the development of their property; suspending work at intervals, not because of any discouragement, or want of appreciation, but because they deem it yet too costly to reduce ores in Colorado. But they believe the time is near when, with the incoming of railroads, and the cheapening of all expenses, gold and silver mills, and furnaces, may be worked to great profit. The company are doing their work thoroughly, the tunnel being 7x7, well secured, and driven without cessation. As it is extended into the mountain, they can count on striking a mineral vein as often as every 100 feet in its progress. The hill rises at an angle of 54 degrees, to a height of more than 700 feet, which will enable them to cut some of their lodes at considerable depth. The company own a good deal of the best property at the head of the gulch. The principal stockholders are of Bloomfield, New Jerrey; S. A. BENSON, President: G. A; WHEELER, Treasurer; J. A. BEACH, Secretary, and J. M. OSBORN, resident manager.

Arizona.

From the Prescott *Miner* of Nov. 4.

The excitement in mining circles continues unabated. The Tiger still rests on its laurels as the greatest min-

eral wonder of the age, and seems to await the advent of capital to render its inexhaustible treasure available. The work of delving and drifting into its argentiferous bosom is, however, progressing as usual, and the already firm confidence of the owners is becoming more deeply rooted at the explosion of every blast. The scarcity of water has necessitated the suspension of work on the Del Pasco. Up to last week the mill had been running, for some two months, three and four hours per day, making in the aggregate a run of 192 hours, during which some 42 tons of the ore were crushed. Upon "cleaning up," this was found to have yielded $2,500 in gold. Work will be resumed as soon as nature shall furnish sufficient water. Indeed, the owners—Messrs. JACKSON—have suspended operations under protest, and not until the already scanty supply of water had fairly "given out."

But the new discoveries in the immediate vicinity of Prescott, are now uppermost in the public mind. The ledges are small, varying from 12 to 18 inches in thickness, but almost incredibly rich. We do not exaggerate when we say that the average rock, taken from the surface, will yield upward of $1,500 to the ton; no piece of rock, from either the Cornucopia or the Bismarck lodes, which has yet been tested has yielded less than $1,000 to the ton, while selected specimens have yielded as high as $3,500. The rock presented by these lodes is precisely similar in character—of a grayish red color, with rock-crystal interspersed, and presenting chloride and horn silver at every fracture. The owners intend to commence work upon these ledges immediately, and already they are proposing to establish a permanent camp there.

Our letter from Wallapai District, Mohave county, brings the usual cheering intelligence of ores rich, richer and richest. The ore from the Lone Star and Empire lodes is constantly improving as the work of sinking progresses. A large quantity of ore from the Little Chief, was being shipped to San Francisco, and a greater quantity was still on hand, at the Empire and other lodes, awaiting shipment. Upon the whole, the mining prospect throughout, from Bradshaw to the Colorado river, is even much brighter than the disturbed condition of the country would seem to warrant. While our hope is for the full and early development of our vast mineral regions, we have, at present, but little expectation of its realization, under the present order of affairs, in which the action of the Government has declared that a human life in Arizona is of less value than the life of a dog in New England.

THE BOGUS DIAMONDS.

In a former issue of the *Miner* we mentioned the fact that the Pinal prospectors, in the course of their peregrinations among the mountains, valleys and canons of the interior, picked up several stones which some supposed to be "diamonds in the rough." It is hardly necessary to state that they proved, upon examination, to be valueless; yet mother nature put them up with intent to deceive. One of these stones handed us a few days ago by a gentleman who constituted an individual member of the Pinal expedition, so exactly resembles an egg, both in color and form, that the shrewdest hen in the country might hatch out her very existence in an effort to bring a chicken from its crystal depths, and never discover that she had been "sold." Upon breaking this stone we found within the semi-transparent crust, which is about one-eighth of an inch thick, a cavity literally filled with beautiful prisoms of rock crystal, all pointing toward the common center and each terminated by a pyramid of six sides. The perfect transparency of these and their lustre in the sun's rays are quite sufficient to suggest the idea of a nest of diamonds to the inexperienced observer. We understand that the Governor has sent about three bushels of these ovulites to San Francisco to have them examined and their value declared. They should be of some value as ornaments.

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CHEMISTS AND ASSAYERS' UTENSILS,

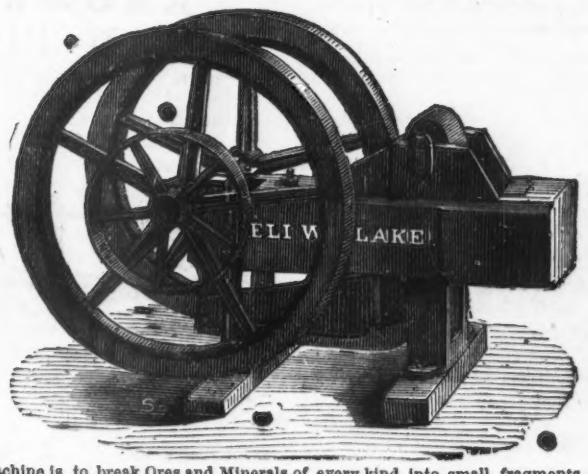
In every variety

Assay Balances,
Furnaces,
Chemicals,
Blow Pipe Sets,
In cases and details,
Crucibles, Cupels, etc.

Also, a very large stock of choice and rare chemicals, and glassware for use in laboratories, may2

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their urthe comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING,

ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

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Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace

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May 17:1y

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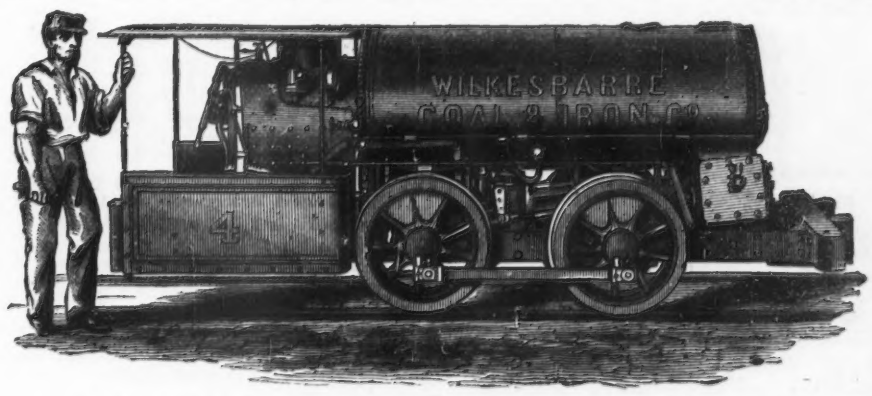
JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.

OXIDE OF ZINC, SPELTER, SHEET ZINC.

Jun28:1y **SPIEGELEISEN CINDER FOR BLAST FURNACES.**



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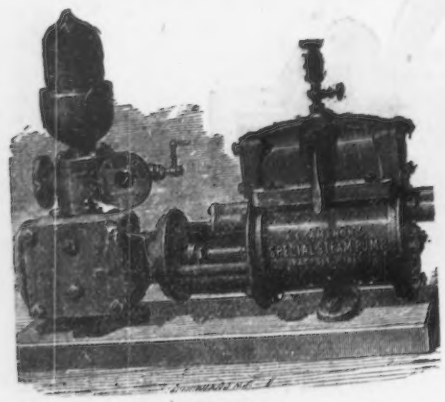

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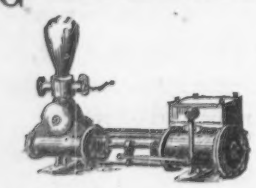

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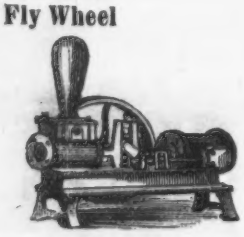

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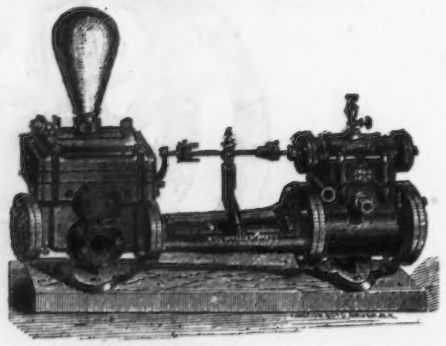

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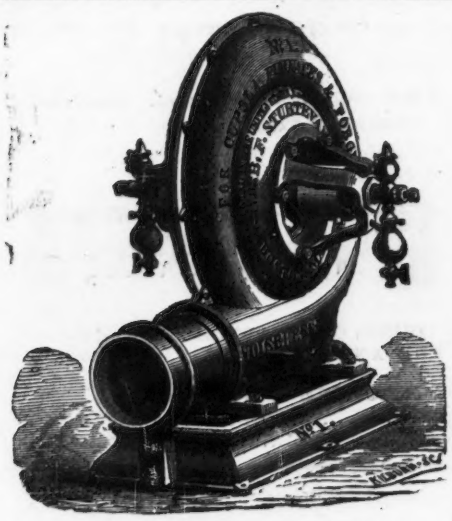

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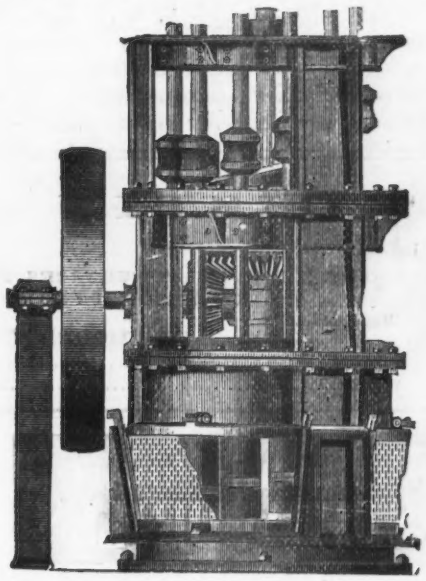

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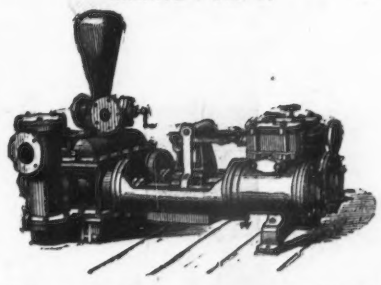

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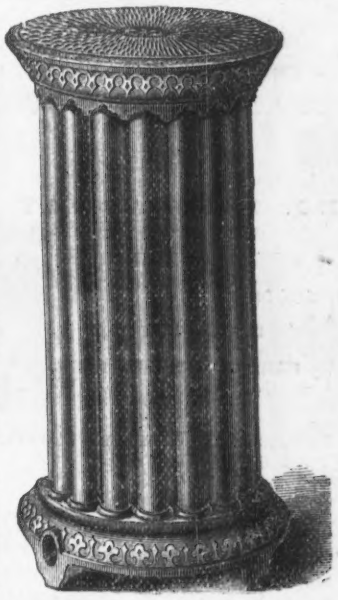

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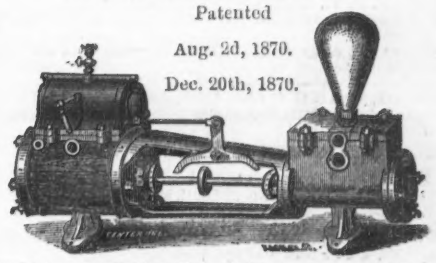

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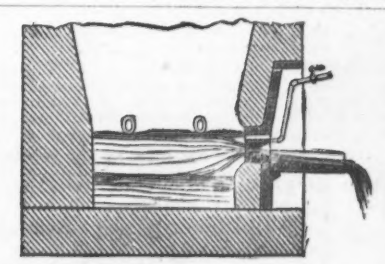

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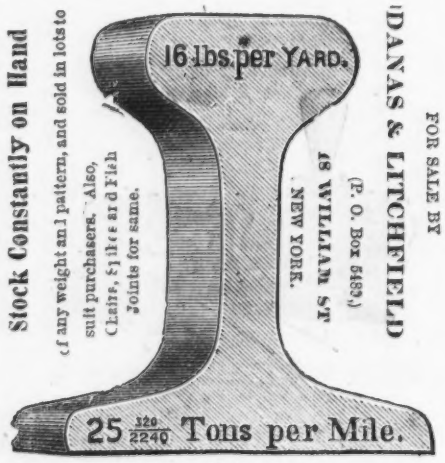
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NOTICE IS HEREBY GIVEN THAT THE Tobacco Manufacturers' Association has changed the place of the Manufacturing part of its business from the city of New York to Greenpoint, in the city of Brooklyn and State of New York, but continues to have its Office and principal place of financial business in the city of New York.

CORTLANDT PALMER, JR., Secretary.

Dated November 18, 1871. n28-3m